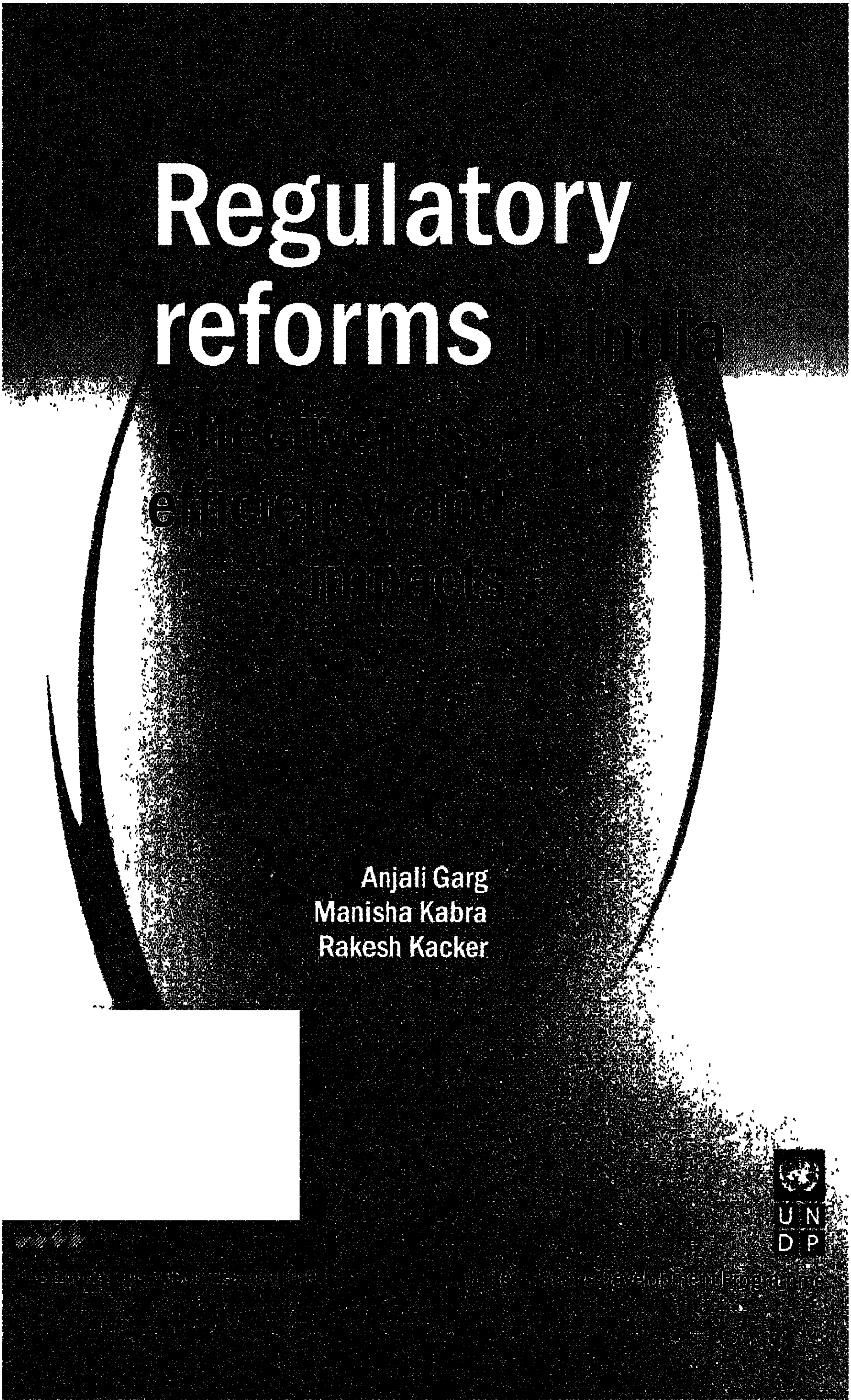

# Regulatory reforms in India

## effectiveness, efficiency and impacts

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The Energy and Resources Institute
United Nations Development Programme

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# Foreword

This publication has considerable significance in view of the major policy initiatives and programmes undertaken by the Government of India in pursuing economic reforms, particularly in the infrastructure sectors of the economy. One important component of the reforms process has been the establishment of regulatory bodies not only at the central level but in several states of the country. This innovation has to be seen against the historical background of most infrastructure activities in India being dominated by the public sector and an overlap between policy as well as regulatory functions performed in the past by the central and state governments. As a result, activities were controlled and services were provided in these sectors essentially by state monopolies, and in the absence of competition and effective regulation, consumer interests often suffered on a progressive basis.

One important objective of economic reforms currently in hand throughout India is to provide a policy and institutional framework whereby investments by the private sector, infusion of new technology, and much better customer orientation are brought about in the supply of services by the major infrastructure enterprises in the country. Given the traditional argument of 'natural monopolies' that dominated thinking in the establishment of electricity supply, telephone services, and several other basic activities, not only is there a need to radically alter existing mindsets, but also the country is generally faced with very limited experience and capacity within the private sector to move quickly ahead for investing in these sectors. Consequently, regulators need to look at market realities and an evaluation of conditions by which the private sector can be drawn into infrastructure industries, while at the same time, upholding the best interests of the consumer.

This Government of India/United Nations Development Programme-funded programme, which has been carried out by TERI through the dedicated involvement of a very competent team at the Institute, has analysed all the complexities in bringing about regulatory reforms, the creation of regulatory institutions and the nexus between appropriate policies and effective regulation. Based on the analysis presented, and some of the conclusions drawn from this study, governments, both at the centre and the states, would certainly arrive at a much better and deeper understanding of the process of regulatory reforms on which depends much of the country's economic future and the welfare of its citizens.

R K Pachauri
Director-General, TERI, New Delhi

# Preface

This publication draws upon the findings of the study titled 'Regulatory reforms in India: effectiveness, efficiency and impacts' conducted by TERI as part of the GoI/UNDP (Government of India/United Nations Development Programme) Economic Reforms Programme.

Independent regulators were introduced in the power and telecom sectors in the mid-1990s. Since then, they have addressed various issues like tariffs, competition, efficiency, investments, and quality of service. Reducing costs, delays, and uncertainties for businesses, and thus improving the attractiveness of the overall business climate are the major goals of regulatory reform. As a result, reform activity is expected to yield consumer benefits in terms of lower prices and wider choices.

While considerable progress has been made on this front, we felt that there is a need to examine the reform process, and assess the impact of regulatory reforms. Such an assessment is needed to make future judgments about the reasonableness of regulatory reforms, and their practicalities for those who have to comply with them and to determine whether regulatory reforms have met the dual goals of 'effectiveness' and 'efficiency'. This would help to improve the understanding of the status of the current regulatory environment and to identify the methods by which this regulatory environment can be improved. The GoI/UNDP Economic Reforms Programme provided an opportunity to undertake such a mid-term evaluation of reforms and the progress made therein.

The various functions and expectations of the regulatory process have been culled out from a multitude of sources. Of these, the focus of this publication is on those that needed attention and could pave the way for effective regulatory intervention for achieving long-term objectives.

We gratefully acknowledge the cooperation and support received from several individuals and organizations in the power and telecom sectors whose views were solicited, in the form of interviews conducted as part of this study. These include government ministries and departments, regulatory commissions, regulated and non-regulated service providers, industry associations, consumer organizations, and independent experts. Many stakeholders were part of the workshop organized by TERI in June 2003 to discuss the findings of this study. These experts – too many to name individually – have added value to the study through their views.

We deeply appreciate the expert comments of our peers from within TERI. These include Dr Leena Srivastava, Executive Director; Dr A R Sihag, Director, Regulatory Studies and Governance Division; Prof. S L Rao, Distinguished Fellow and former Chairman, Central Electricity Regulatory Authority; Mr S Sundar, Distinguished Fellow; and Dr S K Sarkar, Senior Fellow.

We are thankful to the Maharashtra Electricity Regulatory Commission for providing us detailed information on various administrative and financial aspects of its functioning. We are also grateful to the members of the steering committee of this study for their support and valuable inputs. We would also like to accord our thanks to the support given by the Department of Economic Affairs of the Government of India and the UNDP.

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# Introduction

This publication focuses on the impact that the reforms have had on the power and telecom sectors that saw the introduction of independent regulators in the 1990s. The port sector has been left out since the regulator there had only a limited impact as the regulatory powers were confined only to tariff. The insurance sector has also not been included since the duration for which this regulator was in position has been comparatively short.

The time period covered in this assessment is rather short; in the case of telecom just about seven years, whereas in the case of the power sector most of the action is confined to the past two to three years. Nevertheless, even in this short period certain directions have been etched out and some progress can clearly be discerned. This progress needs to be matched with the expectations from the new style of governance introduced through independent regulation. Broadly, this publication attempts to answer the question of whether regulatory reforms have yielded the desired results. Given the nature of the sectors, the bulk of the analysis has been done through a qualitative assessment made after interviews with various stakeholders and TERI's own understanding of the reform process. Wherever possible, concrete quantitative analysis has been made, and where data are not available, the lines along which quantitative analysis can be carried out in the future have also been indicated.

Apart from this, a more detailed analysis of the concept of a multi-sector regulator has been made. As the focus is on making regulation more effective, the multi-sector regulator concept has been discussed from this perspective in this publication. This is necessary because in the future as more sectors, both at the centre and in the states, come under regulation, there would be a need to understand the circumstances under which a multi-sector regulator would enhance the effectiveness of the regulatory process.

This publication comprises three sections.

1 Regulatory impact assessment of the power sector
2 Regulatory impact assessment of the telecom sector
3 Assessment of a multi-sector regulator

To comprehend the effectiveness of the regulatory process, it is necessary to analyse the actions of the various stakeholders. The actions can be classified into two: firstly, actions that are taken in response to the regulatory process and the decisions of the regulator and secondly, decisions and actions that are taken by the various entities that would support the actions of the regulators. Thus, action by the utility to educate consumers about their rights and the quality of supply/service standards would *supplement and support* the regulatory efforts to lay down and enforce such standards. At the same time, efforts made by the utilities to improve these standards would constitute a direct *response* to the actions of the regulators. The process can be said to be effective if there is a direct response to the actions of the regulators in the desired direction and at the expected pace. The effectiveness of the process gets enhanced if it is accompanied by supporting measures.

In judging the efficiency of the regulatory process, the primary consideration is the speed with which the process is able to move the sector in the desired direction. In India, the regulator has been called upon to perform primarily a development function. Both in the power and the telecom sectors, access and quality of supply are major issues. In addition, in the power sector, there is the major problem of restoring the financial health of the sector; the regulatory process was expected to play a prominent role in this process. Similarly, the regulatory process was expected to help the telecom sector move away from the monopolistic structure of the past to being a highly competitive sector making use of the latest technologies.

When assessing the effectiveness and efficiency of regulatory reforms, a few points have to be borne in mind. For example, in the telecom sector, the government retains the powers of licensing and induction of competition in the sector and the number of players to be licensed in each segment. At the same time, it is also well known that competition and technology play an important role in bringing down tariffs. As competition grows and develops, the market is often able to take care of various issues and the regulator only plays a monitoring role. However, there is no denying that the regulator also plays an important role in facilitating competition.

In such a scenario, it would be difficult to identify the effectiveness of the regulator and the impact made solely by the regulator's orders, directives, and regulations. Moreover, with the developments being guided by the government, competition, and the regulator, it is rather difficult to quantify the impact made by each of these entities individually. Therefore, for the purpose of this publication, the resulting developments and outcomes in the sectors are being credited to what can be called 'regulatory reforms'.

Given the relatively short duration of the reform process, this publication is limited to assessing whether movement is in the right direction. Only where data are available can a more rigorous exercise be done to assess the quantification and speed of this movement. This has been done for the power sector for tariff rebalancing and for the telecom sector on the reduction of tariffs.

In assessing what was expected from the regulatory process, several documents have been referred to. First are the policy documents that led to the establishment of the regulators in the two sectors. For the telecom sector, these are the National Telecom Policy of 1994 and the National Telecom Policy of 1999. In the power sector, which is on the concurrent list, the key national-level document is the Common Minimum National Action Plan for Power of 1996. By this time reforms in Haryana and Orissa were well under way, thus reference has also been made to the Plan documents. These Plan documents give some insights into the processes at work at the national level, which led to the creation of regulatory bodies in these states. The Acts creating the regulators, which delineate their functions, but do not prioritize among the number of duties of the regulators, have also been mentioned.

# Regulatory reforms in the power sector

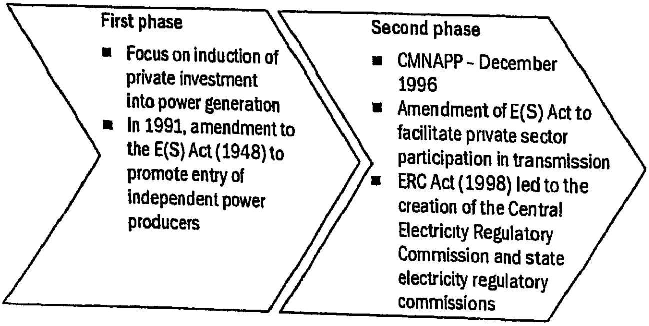
## Background and the present status of reforms

Since the early 1990s, the power sector in India has been going through a process of reforms and restructuring. In the first phase of reforms, beginning 1991, the focus was on the induction of private investment into power generation. In 1991, the government opened up the Indian power sector by an amendment to the E(S) Act (Electricity [Supply] Act) (1948) thereby promoting the entry of independent power producers. A number of private players evinced interest in power generation, but till date only a few projects have come on ground.

The second phase of reforms began in the mid-1990s when there was widespread realization that more comprehensive reforms were required, including changes in the regulatory set-up to tackle the problems facing the sector. This paved the way for chartering a new policy and in December 1996, the CMNAPP (Common Minimum Action Plan for Power) was framed with primary agenda of setting up regulatory commissions at the centre and state levels. Besides, it proposed to restructure and corporatize the SEBs (state electricity boards), to allow them greater autonomy and permit them to operate along commercial lines. The other important agenda was the rationalization of tariffs. In 1998, the E(S) Act (1948) was further amended to facilitate private sector participation in power transmission services.

Orissa was the first state in the country to embark on a major reforms process from 1996, following the enactment of the Orissa Electricity Reforms Act (1995). The reforms programme gained momentum with the enactment of the ERC (Electricity Regulatory Commissions) Act (1998). Under the provisions of this Act, the central government constituted the CERC (Central Electricity Regulatory Commission) to regulate the operations/businesses relating to the central sector as well as interstate issues. The CERC regulates the tariff of generating companies, owned or controlled by the Government of India, and any other generating company, which has a composite scheme for generation and the interstate transmission of energy including tariff of the transmission utilities. A number of states followed suit in the creation of their own state regulatory commissions either through the enabling provision of the central Act or their respective state Acts. Figure 1 gives a snapshot of power sector reforms in India.

The Electricity Act (2003), notified on 2 June 2003 and brought in force from 10 June 2003, will replace the three existing Acts, namely the Indian Electricity Act (1910); the E(S) Act (1948), and the ERC Act (1998). At present, 22 states – Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu,



**First phase**

- Focus on induction of private investment into power generation
- In 1991, amendment to the E(S) Act (1948) to promote entry of independent power producers

**Second phase**

- CMNAPP - December 1996
- Amendment of E(S) Act to facilitate private sector participation in transmission
- ERC Act (1998) led to the creation of the Central Electricity Regulatory Commission and state electricity regulatory commissions

Figure 1 Snapshot of power sector reforms in India

Uttaranchal, Uttar Pradesh, and West Bengal – have either constituted or notified the constitution of state electricity regulatory commissions and most of them have already issued their first tariff orders. Orissa was the first state to privatize its distribution business (1999/2000) followed by Delhi (July 2002). All the states, except Manipur and Tripura, have signed the memorandum of agreement with the Government of India. The present status of reforms in the states is given in Table 1.

**Table 1** Current status of power sector reforms in states

| State | *Status of reforms* |
|---|---|
| Andhra Pradesh | SERC (State Electricity Regulatory Commission) constituted and is functional<br>Tariff orders issued<br>Reform law enacted<br>SEB (State Electricity Board) unbundled<br>MoU (Memorandum of Understanding) signed with the Government of India |
| Arunachal Pradesh | SERC notified (yet to be constituted) |
| Assam | Single-member SERC constituted<br>Tariff order issued<br>MoU signed with the Government of India |
| Bihar | MoU signed with the Government of India<br>Tariff revised by the SEB<br>SERC notified (yet to be constituted) |
| Chhattisgarh | SERC constituted<br>MoU signed with Madhya Pradesh adopted |
| Delhi | SERC constituted and is functional<br>Tariff orders issued<br>Reform law enacted<br>Distribution privatized |
| Goa | MoU signed with the Government of India<br>Single-member commission constituted |

*Continued*

**Table 1** *Continued*

| State | *Status of reforms* |
|---|---|
| Gujarat | SERC constituted and is functional<br>Tariff orders issued<br>The Gujarat Electricity Industry (Reorganization and Regulation) Act, 2003, notified<br>MoU signed with the Government of India |
| Haryana | SERC constituted and is functional<br>Tariff orders issued<br>Reform law enacted<br>SEB unbundled<br>MoU signed with the Government of India |
| Himachal Pradesh | Single-member commission constituted<br>Tariff orders issued<br>MoU signed with the Government of India |
| Jammu and Kashmir | The state government has appointed the Administrative Staff College of India as consultant for conducting reform studies |
| Jharkhand | SERC constituted<br>MoU signed with the Government of India |
| Karnataka | SERC constituted and is functional<br>Tariff orders issued<br>Reform law enacted<br>SEB unbundled<br>MoU signed with the Government of India |
| Kerala | MoU signed with the Government of India<br>SERC constituted |
| Madhya Pradesh | SERC constituted<br>Tariff orders issued<br>Reform law passed by the Assembly and notified<br>MoU signed with the Government of India |
| Maharashtra | SERC constituted and is functional<br>Tariff orders issued<br>MoU signed with the Government of India |

*Continued*

**Table 1** *Continued*

| State | *Status of reforms* |
|---|---|
| Orissa | SERC constituted and functional<br>Tariff orders issued<br>Reform law enacted<br>SEB unbundled<br>Distribution privatized<br>MoU signed with the Government of India |
| Punjab | SERC constituted and is functional<br>Tariff orders issued |
| Rajasthan | SERC constituted and is functional<br>Tariff orders issued<br>Reform law enacted<br>SEB unbundled<br>MoU signed with the Government of India |
| Tamil Nadu | SERC constituted<br>MoU signed with the Government of India<br>Tariff orders issued |
| Uttar Pradesh | SERC constituted and is functional<br>Tariff orders issued<br>Reform law enacted<br>SEB unbundled<br>MoU signed with the Government of India |
| Uttaranchal | MoU signed with the Government of India<br>SERC constituted and is functional<br>SEB unbundled |
| West Bengal | SERC constituted<br>Tariff orders issued<br>MoU signed with the Government of India<br>SEB unbundling initiated |
| Nagaland, Meghalaya, Mizoram, Tripura, Manipur, and Sikkim | Have shown willingness to constitute Joint Electricity Regulatory Commission |

**Source** Compiled by TERI; MoP (2002)

## Parameters to measure efficiency, effectiveness, and impact of reforms

Some of the important parameters on the basis of which the efficiency and effectiveness of reforms in the power sector in India can be evaluated include transparency, consumer participation, T&D (transmission and distribution) losses, QoSS (quality of supply and service), investment and competition, financial performance, and PLF (plant load factor).

### *Decision-making processes*

#### Transparency, information availability, and public participation

The different sections of the ERC Act (1998) that deal with the issues of independence, transparency, and public participation are as follows.

#### Functions of regulator

- Section 22(2)(k) – To collect and record information concerning the generation, transmission, distribution, and utilization of electricity
- Section 22(2)(l) – To collect and publish data and forecasts on the demand for, and use of, electricity in the state and to require the licences to collect and publish such data.

#### Transparency

- Section 37 – Transparency in Commissions: the Commissions shall ensure transparency while exercising their powers and discharging their functions.

Apart from the above sections, sections 17–21 of Chapter IV of the ERC Act (1998) give the provisions in respect of the establishment and incorporation of state commissions; constitution of selection committee by the state governments; term of office, salary and allowances, and other conditions of service of the chairperson and members; and removal of members and the appointment of officers and other staff of the commissions.

Almost all the regulatory commissions established have already issued a number of regulations on issues related to service rules, appointment of consultants, advisory committees, consumer's right to information, complaint handling procedure, tariff, licensing, etc.

It is thus observed that in the reform process, the regulatory commissions were envisaged to function independently, bring in greater transparency and improve information availability in the sector, and involve consumers in the regulatory process.

There was broad consensus among all the stakeholders interviewed for this study on the issues of independence, transparency, and public participation. There was general agreement that in most of the states the regulators have been able to work independently. However, some states have experienced problems, especially in the initial stages of establishing regulatory commissions. The reasons for this include lack of administrative and financial support from the state governments and lack of political commitment in certain states.

The reform process and the consequent setting up of regulatory commissions at the state level has indeed brought about greater transparency and openness in the decision-making processes. The consultative process followed by the regulatory commissions has provided an opportunity to all the interested parties to be heard. The public hearing process followed by the commissions has also led to greater awareness among consumers about the sector and its related issues.

An important outcome of the regulatory process has also been to put the resultant pressure on utilities, as they now have to work in an environment of transparency and consumer awareness. As a result of this, in general, more information and data on the performance of the utilities are now available to the stakeholders.

The regulatory process has helped not only the consumers but also the utilities to openly put forth their views. The regulatory set-up has enabled the utilities, specially those in the public sector, to present their cases independent of the government. This is clearly reflected in the case of Maharashtra, where the state government filed an affidavit on the petition submitted by the Maharashtra State Electricity Board to the Maharashtra Electricity Regulatory Commission for revision of tariffs (Box 1).

In this context, the study on 'Independent Regulatory Bodies: institutional relationships and long term vision' that was prepared for the UNDP (United Nations Development Programme) Economic Reforms Programme dealt with the role and relationship issues of the key stakeholders including the government, regulator, regulated entities, and the consumers. Prayas (Pune), a registered charitable trust, has

### **Box 1** The case of Maharashtra

The MSEB (Maharashtra State Electricity Board) submitted a petition for tariff revision to the MERC (Maharashtra Electricity Regulatory Commission) on 15 March 2001. The GoM (Government of Maharashtra) on the last day of the public hearing made a submission to be permitted to file an affidavit and presentation before MERC in this matter. After two extensions as requested by the GoM, the affidavit was submitted on 5 November 2001. In this affidavit, the GoM specified the category-wise tariffs to be charged and submitted that it had the power to issue policy directives to the state commission in public interest under Section 39 of the ERC (Electricity Regulatory Commissions) Act (1998). Subsequently, the MSEB also filed its response on the affidavit against GoM's intention to adjust tariffs and to provide subsidy to select consumers. After the public hearing on this, the Commission decided to ignore the category-wise tariffs proposed by the GoM and only considered the policy that the GoM desired to subsidize the domestic, power loom, agricultural, and street lighting categories.

also undertaken a survey-based study on ERCs in India, which covers a wide range of issues on the functioning of these commissions. The study includes 13 ERCs and covers issues relating to independence and autonomy, empowerment, accountability, transparency and public participation, quality of professionals, and social sensitivity of ERCs. All these issues have been covered extensively in these two studies. The survey conducted for the Prayas study shows that the institution of regulatory commissions in the power sector has made a good beginning in terms of bringing in more transparency and public participation in the governance of this sector. However, the study also concluded that the commissions will have to be proactive in their efforts to ensure meaningful public participation and transparency in their functioning.

## Transmission and distribution losses

One of the most important reasons for the huge financial crisis faced by the electricity boards is the high level of T&D losses. T&D losses were not taken to be a major issue in 1998 and though the Ninth Five-year Plan recognized the high levels of these losses, it targeted a reduction rate of one per cent a year. The all-India average figure for T&D losses reported in 1997/98 was 24.79%, which was much below the actual levels and the estimates for 2000/01 indicated these losses at 29.9% (Planning Commission 2002). Neither the CMNAPP nor the report (submitted on 10 March 1995) of the committee on power constituted by the National Development Council laid much emphasis on the need to reduce T&D losses. The CMNAPP did provide for compulsory energy audit of large consumers (100 kVA and above); compulsory metering at substations and on all major feeders; compulsory metering of all new electricity connections as also of connections to agricultural sector exceeding 10 HP to be undertaken and completed in two years; and all electric supplies to be metered by 2002.

## Table 2 Transmission and distribution losses by state (%)

| State | *1994/95* | *1995/96* | *1996/97* | *1997/98* | *1998/99* | *1999/2000* | *2000/01* | *Year of establishment of the Commission* |
|---|---|---|---|---|---|---|---|---|
| Orissa | 23.8 | 46.9 | 50.4 | 49.2 | 45.2 | 45.2 | 49.9 | 1996 |
| Uttar Pradesh | 22.6 | 22.8 | 28.0 | 25.5 | 26.3 | 42.2 | 39.8 | 1999 |
| Karnataka | 18.9 | 18.5 | 18.9 | 18.6 | 29.9 | 38.0 | 36.5 | 1999 |
| Andhra Pradesh | 18.9 | 18.9 | 33.1 | 32.5 | 31.9 | 35.2 | 32.9 | 1999 |
| Maharashtra | 15.3 | 15.4 | 17.7 | 17.1 | 30.5 | 30.5 | 30.0* | 1999 |
| West Bengal | 21.1 | 20.7 | 20.1 | 20.0 | 25.5 | 29.7 | 30.0 | 1999 |

* The T&D loss as reported by the Maharashtra State Electricity Board in its tariff petition (2001/02) to the Maharashtra Electricity Regulatory Commission for 2000/01 was 39%–49%.

*Note* The encircled figures represent the consecutive years when there was a sharp increase in T&D losses coinciding with the establishment of the regulatory commission.

Before the regulatory reform process began, the electricity utilities were showing lower levels of T&D losses as compared to the actual levels. One of the biggest achievements of the regulatory process has been the recognition of the actual levels of T&D losses in the states by the utilities (Table 2). This improved quality of information has led to increased pressures on the utilities to reduce losses and improve efficiency levels.

Table 2 shows that there has been a sharp increase in the T&D losses as estimated by the utilities after the beginning of the regulatory reform process. This in most cases is due to a more accurate estimation of electricity consumption for unmetered categories like agriculture.

Though it shows a marginal reduction in the losses, the decline is not enough to bring about a turnaround in the financial positions of the boards. Some utilities like the Central Power Distribution Company of Andhra Pradesh Ltd have, however, managed to bring down the T&D losses from 44.33% in 2000/01 to 19.19% in 2003/04 (Box 2).

The DISCOMs (distribution companies) in Delhi submitted their aggregate revenue requirements for 2002/03 and 2003/04 to the DERC (Delhi Electricity Regulatory Commission). The DISCOMs had submitted in the petitions that they had achieved the AT&C (aggregate technical and commercial) loss reduction targets. However, the DERC in its tariff order has recognized that the DISCOMs have underachieved the targets but for the purpose of tariff it has taken the targets agreed upon as part of the privatization process.

Table 3 gives the loss reduction targets that were agreed upon through the bidding process between the GNCTD (Government of the National Capital Territory of Delhi) and the DISCOMs.

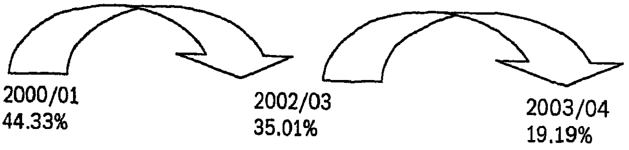
## Box 2 Experience of the APCPDCL (Central Power Distribution Company of Andhra Pradesh Ltd)

**Background**

The transmission and bulk supply business was separated from the distribution and retail supply business by creation of separate undertakings for distribution and retail supply business in March 2000. The APTRANSCO (Andhra Pradesh Transmission Company Limited) retained the business of transmission and bulk supply while four DISCOMs (distribution companies) were constituted to undertake distribution and retail supply business. These are (1) the APEPDCL (Eastern Power Distribution Company of Andhra Pradesh Ltd), (2) the APCPDCL (Central Power Distribution Company of Andhra Pradesh Ltd), (3) the APNPDCL (Northern Power Distribution Company of Andhra Pradesh Ltd), and (4) the APSPDCL (Southern Power Distribution Company of Andhra Pradesh Ltd).

**Distribution loss levels**

The APCPDCL started operations with an initial distribution loss level of 44.33% in 2000/01 and has been able to reduce it to 35.01% in 2002/03. The APERC (Andhra Pradesh Electricity Regulatory Commission) in its tariff order for 2003/04 has accepted their projection of 19.19% for 2003/04 and has computed the power purchase requirement on this basis. This shows a substantial reduction in losses for a utility that is still in the public sector domain.



## Table 3 Aggregate technical and commercial loss reduction targets in Delhi (%)

| Distribution company | *2002/03* | *2003/04* | *2004/05* | *2005/06* | *2006/07* |
|---|---|---|---|---|---|
| North Delhi Power Ltd | 0.50 | 2.25 | 4.50 | 5.50 | 4.25 |
| BSES Rajdhani | 0.55 | 1.55 | 3.30 | 6.00 | 5.60 |
| BSES Yamuna Power Ltd | 0.75 | 1.75 | 4.00 | 5.50 | 5.00 |

## Quality of supply and service

One of the important parameters to measure the efficiency and effectiveness of reforms is the adequacy of supply and service of electricity, i.e. ensuring that consumers get what they deserve in terms of not only reducing shortages but also improving the quality of power. However, in the pre-reform period, consumer preferences and needs have not been taken into account while planning and virtually no incentives were provided to improve the QoSS. It is only in the recent past, after reforms have been initiated in the power sector, that this issue is gaining importance and due attention.

Subsections (g) and (i) of Section 22(2) of the ERC Act (1998) explicitly give the functions of the state commissions in respect of the QoSS standards. It states:

> *22 (2) Subject to the provisions of Chapter III and without prejudice to the provisions of sub-section (1), the State Government may, by notification in the Official gazette, confer any of the following functions upon the State Commission, namely*
> *(g) to set standards for the electricity industry in the State including standards relating to quality, continuity and reliability of service;*
> *(i) to lay down and enforce safety standards.*

However, not all state commissions have been given powers under Section 22(2) to regulate the QoSS and have powers under Section 22(1) to mainly regulate tariffs. A number of state commissions like Andhra Pradesh, Delhi, Haryana, Himachal Pradesh, Karnataka, and Orissa have taken the first step in this direction by setting standards on QoSS. Rajasthan has also initiated the process of drafting regulations for these standards. However, much still needs to be done in terms of monitoring the violations of the standards and penalizing the utility for such violations.

A list of some of the indicators of QoSS common to the norms set up by different regulatory commissions across India is given below.

- Maximum time limit for inspecting complaints about faulty meters (token penalty imposed by the HPERC [Himachal Pradesh Electricity Regulatory Commission]).
- Maximum time limit for providing new connection (token penalty imposed by the HPERC and the DERC).
- Maximum time limit for acknowledging, investigating, and resolving consumer's complaints on erroneous billing (token penalty imposed by the HPERC and the DERC).
- Maximum time limit for scheduled outage and prior information.
- Minimum time limit for notice prior to disconnection.

Table 4 compares some of the QoSS standards set by various commissions. It also shows that there has been a shift towards greater emphasis on QoSS by the regulatory commissions and some commissions have prescribed QoSS standards. However, not much has been done in terms of monitoring and quantification of these standards and violations by the utilities, and there are no provisions for monitoring whether the time limits for redressal are adhered to. No commission, other than Gujarat and Uttar Pradesh, has initiated an independent survey to assess whether such standards have been achieved. In the absence of any monitoring system, it is not possible to assess the impact of regulations. In contrast, in the telecom sector, the regulator has undertaken surveys to assess the QoS (quality of service) in the sector. This is discussed in detail later in this publication.

As far as frequency levels are concerned, it is seen that in the southern region, improvement has been observed after availability-based tariff was implemented. Figure 2 brings

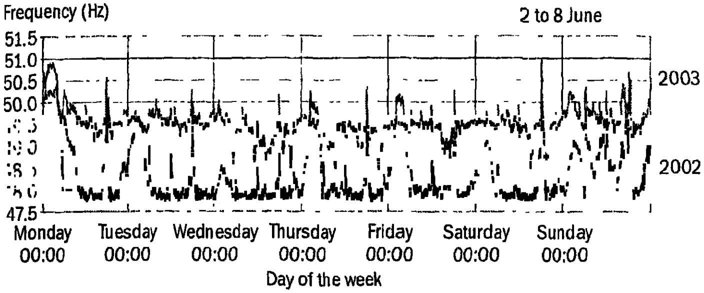


**Figure 2** Frequency comparison for the southern region: 2002 and 2003
**Source** SRLDC (2003) http://www.srldc.org

this out clearly by comparing the frequency for the weeks of 2–8 June of 2002 and 2003.

The need is, therefore, to quantify the levels of QoS achieved. As a first step, some of the indices that can be developed to measure can be based on the frequency of power supply, and voltage and number of hours for which supply is available. A comparison could be made between different regions on the total number of hours in a year during which the frequency of power supply was within an acceptable frequency band. This information is available with the regional load dispatch centres. One could also look at the total number of hours of supply and compare this over the years and across states. As far as voltage is concerned, sample monitoring can be done to assess the variations in voltage. At present, meters are in most cases available at the sending end of distribution feeders, hence, this could currently be monitored at the feeder level at least in the short term. More indices, especially those related to services at the consumers end, could be considered as more data become available in the future.

## Table 4 Standards of performance in terms of quality of supply and services

Redressal standards (Indicative maximum time limit for rendering service)

| Indices | *Andhra Pradesh Electricity Regulatory Commission* | *Orissa Electricity Regulatory Commission* | *Karnataka Electricity Regulatory Commission* | *Himachal Pradesh Electricity Regulatory Commission* | *Delhi Electricity Regulatory Commission* | *Haryana Electricity Regulatory Commission* |
|---|---|---|---|---|---|---|
| Fuse-off call<br>■ Urban<br>■ Rural | ■ 4 hours<br>■ 12 hours | 4 hours initial response time and 24 hours for restoration[1] | ■ 4 hours<br>■ 24 hours | ■ 6 hours[2]<br>12 hours[3]<br>■ 24 hours | — | ■ 4 hours<br>■ 8 hours |
| Voltage complaint and responding to it | ■ Initial response 4 hours<br>■ 10 days or 120 days if system upgradation needed | ■ Initial response 4 hours<br>■ 15 days or 6 months if system upgradation required | ■ 4 days — urban<br>■ 8 days — rural[4] | 4 weeks of receipt of complaint | — | Local fault—4 hours for urban and 8 hours for rural<br>LT (low tension)—60 days<br>HT (high tension) distribution system—180 days[5] |
| Inspecting complaints about faulty meters | Testing of meter 7 working days<br>Replacement 30 days from receiving complaint | Faulty meters replacement 30 working days from the date of removal of faulty meter | 7 days for urban<br>10 days for rural | 2 weeks for urban<br>3 weeks for rural | Testing of meter—15 working days[6]<br>Replacement—within 30 days of testing | 14 days from the day of complaint[7] |

|  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| Providing new connection[8] | 15–30 days[9] from approval | 7 days from approval | 15 days from approval | 1 month after approval | 7–30 days[10] after approval | 15 working days after approval |
| Time limit set for scheduled outage per day | Notice 24 hours prior to outage (maximum of 12 hours) | Notice 24 hours prior to outage (maximum of 12 hours) | Outage for more than 10 hours prior notice 2 days | Prior notice 24 hours | – | Maximum up to 8 hours |
| Minimum time limit for notice prior to disconnection[11] | 7 days | 24 hours to 7 clear days | 24 hours to 7 clear days | – | 7 clear days | – |

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[1] Does not differentiate between rural and urban areas.

[2] Complaints received between 9 a.m. and 9 p.m.

[3] Complaints received between 9 p.m. and 9 a.m.

[4] This is for voltage fluctuation in case of low voltage; 15 days for local and 6 months if it requires augmentation of distribution system.

[5] If the complaint requires upgradation of system parameters then problem would be redressed.

[6] Since regulation 19 requires regular periodic testing to be carried out by the licensee, in case the meter is found faulty in testing the meter shall be replaced within 30 days of testing.

[7] Within seven days of filing the application together with the testing fee, a tested check meter will be installed for not less than seven days, in case the existing meter is found faulty the same would be removed leaving the check meter in its place.

[8] There are separate rules given for LT/HT/EHT and LT agricultural consumers. Here we discuss for 230/400 V consumers.

[9] In case a line extension or additional/enhancement of distribution transformer is involved.

[10] If line extension is required, this period shall be 21 days for an extension up to 5 poles and 30 days for more than 5 poles.

[11] Disconnection can be done without prior approval in case the connection causes safety hazards.

**Source** TERI (2002)

## Private sector investment and competition

### *Generation*

As far as the generation segment is concerned, the capacity addition targets and actual achievement in the Ninth Plan (1997–2002) and the Tenth Plan targets are given in Table 5.

Figure 3 gives a comparative picture of Ninth Five-year Plan targets and the achievement for capacity addition, while Figure 4 gives a comparison of the targets for the Ninth and Tenth Five-year Plans.

The capacity addition of 19 015 MW during the Ninth Plan represents 47% of the targeted addition. In contrast, capacity addition during the Eighth Plan was 54% of the target (16 422 MW against the target of 30 538 MW).

**Table 5** Capacity addition targets and achievement in the Ninth and Tenth Plans

| Sector | *Ninth Plan target* (MW) | *Ninth Plan achievement* (MW) | *Ninth Plan achievement/ target* (%) | *Tenth Plan target* (MW) |
|---|---|---|---|---|
| Central | 11 909 | 4 504 | 37.82 | 22 832 |
| State | 10 748 | 9 450 | 87.92 | 11 157 |
| Private | 17 588 | 5 061 | 28.78 | 7 121 |
| Total | 40 245 | 19 015 | 47.25 | 41 110 |

**Source** Tenth Five-year Plan (2002–07)

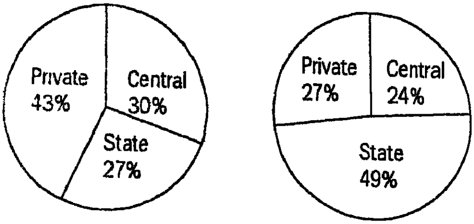

**Figure 3** Ninth Plan target versus achievement

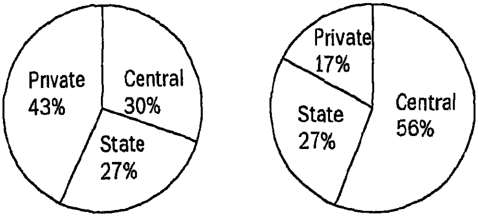

**Figure 4** Ninth Plan target versus Tenth Plan target

The main reasons for the shortfall in capacity addition are (1) the inability to get private sector projects off the ground in the absence of adequate arrangements for ensuring payment security, (2) delay in land acquisition and environmental clearances, (3) unresolved issues relating to fuel linkages, (4) contractual problems, (5) resettlement and rehabilitation problems, and (6) law and order problems.

As seen from Table 5, the contribution of the public sector investment in the Tenth Plan outlay has increased. Thus, the public sector will continue to play a dominant role during the Tenth Plan, while progress along the reform path helps clear the roadblock for greater private participation. Between the Ninth and the Tenth Plan targets, the share of the central sector has increased from 30% to 56% and that of the private sector has fallen from 43% to only 17%. The share of the state sector has remained unchanged at 27% (Figure 4). Thus, regulatory reforms have not helped in creating an atmosphere conducive to promoting private sector investment; in fact, the roles of the public and private sectors have reversed as is evident in the Tenth Plan.

### *Transmission*

Initiatives have been taken by the Ministry of Power for encouraging private sector participation in transmission. Two routes have also been identified for this, namely IPTC (independent power transmission company) and JV (joint venture). The JV route envisages equity participation by the

CTU/STU (central transmission utility/state transmission utility) through formation of a JV company between CTU/ STU and private investor selected as JV partner whereas the IPTC route envisages 100% fund mobilization by private entrepreneur. However, not much achievement has been made in attracting private investment in transmission.

### *Distribution*

The thrust of the reform programme was also on the privatization of the distribution segment in various reforming states and to make distribution a viable proposition. This was also emphasized in Section 22 of the ERC Act (1998), which states:

- 22(1)(d) to promote competition, efficiency, and economy in the activities of the electricity industry to achieve the objects and purposes of this Act, and
- 22(2)(h) to promote competitiveness and make avenues for participation of private sector in the electricity industry in the state, and also to ensure a fair deal to the customers.

Orissa was the first state to privatize its distribution business (1999/2000), followed by Delhi (July 2002). Not much progress has, however, been made in this respect in other parts of the country. In some states like Andhra Pradesh, Haryana, Rajasthan, Karnataka, and Uttar Pradesh, the generation, transmission, and distribution functions have been unbundled and the entities corporatized. However, the actual bidding process to privatize the sector has not yet taken place in these states. This is due to the concerns of the potential bidders on the high degree of regulatory uncertainty, irrational tariff structures with very low agricultural tariffs, and unrealistic estimation of losses, receivables, and loss reduction targets.

All the stakeholders consulted during the course of this study agreed that private sector investment in the sector has

**Box 3** KESCO (Kanpur Electricity Supply Company) privatization case

The Government of Uttar Pradesh first initiated the process of privatization of the KESA (Kanpur Electric Supply Authority) in early 1999. However, this process has not yet been completed. The government decided to convert KESA into a company in June 1999, but KESCO was formed only in January 2000. Of the four pre-qualified bidders – BSES Ltd, CESC (Calcutta Electricity Supply Company) Ltd, L&T-AES (Larsen & Toubro Ltd and AES Combine), and TEC (Tata Electric Company) – only CESC submitted its bid at the time of bid submission in July 2000. However, even CESC withdrew its bid as the remaining three bidders abstained from submitting their offers. After this, no progress has been made in respect of attracting private players for taking over KESCO. The latest status on the KESCO privatization is that the NTPC (National Thermal Power Corporation) is planning to take up distribution of power in Kanpur through its subsidiary NESCL (NTPC Electricity Supply Company Ltd).

been below expectations and insufficient. One of the reasons cited for this is the financial unviability due to which investors are unwilling to make investments. A recent example of this is the KESCO (Kanpur Electricity Supply Company) privatization case (Box 3). Also, at present there are a limited number of private players in the power sector, thus weakening the response to increased private sector participation. Regulatory uncertainty has also been cited as a reason for low private sector response.

### *Distribution of power sector outlay*

The share of outlay on the generation component in the total power sector outlay used to be much higher than the corresponding share of the T&D component. However, the Ninth Plan saw a change in this trend with the generation component showing a decline. Figure 5 illustrates the distribution of the power sector outlay from the First Five-year Plan to the Ninth.

The generation component has declined to 51% in the Ninth Plan (2002–07) from 72% in the Eighth Plan.

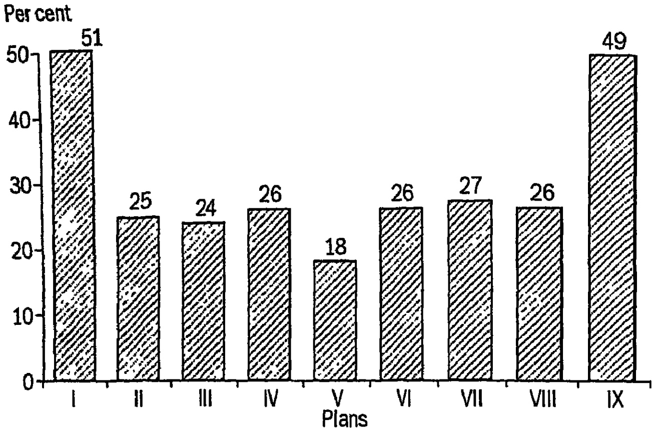

**Figure 5** Distribution of power sector outlay (%)
**Source** Planning Commission, various plan documents

Correspondingly, the T&D component has increased from 26% to 49% in the same period. This increase in the T&D component is not the result of a deliberate shift in policy, rather it comes as an unintended benefit of the decline in investments in generation.

## Financial performance

The financial health of the SEBs has deteriorated over the years mainly due to high level of T&D losses and subsidized sale of electricity especially to the agricultural and domestic consumers. Table 6 (a and b) gives the estimates of agricultural and domestic subsidies, commercial losses, and the average rate of return in the power sector for the pre-reform and the post-reform periods.

As per the Tenth Five-year Plan (2002–07), the subsidy on account of sale of electricity to the agricultural sector is expected to come down to 269 590 million rupees for 2002/03 (annual plan projections). It would be interesting to see if this progress can be achieved. Many state governments had agreed to provide the subsidy amount to the utilities to

**Table 6(a)** Pre-reform financial performance (million rupees)

| Item | *1993/94* | *1994/95* | *1995/96* | *1996/97* | *1997/98* |
|---|---|---|---|---|---|
| Subsidy to | | | | | |
| ▪ Agriculture | 89 960 | 109 410 | 136 060 | 155 852 | 177 067 |
| ▪ Domestic | 21 308 | 25 368 | 32 244 | 43 860 | 52 584 |
| Commercial losses | 50 600 | 61 250 | 87 700 | 113 050 | 139 630 |
| Rate of return (%) | –12.3 | –13.1 | –16.4 | –19.2 | –22.9 |

**Table 6(b)** Post-reform financial performance (million rupees)

| Item | *1998/99* | *1999/00* | *2000/01*[a] | *2001/02*[b] | *2002/03*[b] |
|---|---|---|---|---|---|
| Subsidy to | | | | | |
| ▪ Agriculture | 206 940 | 225 090 | 246 990 | 281 230 | 269 593 |
| ▪ Domestic | 63 325 | 81 211 | 100 361 | 122 385 | 116 510 |
| Commercial losses | 208 600 | 263 530 | 252 590 | 331 770 | 243 209 |
| Rate of return (%) | –34.1 | –43.1 | –39.1 | –44.1 | –32.08 |

[a] revised estimates; [b] Annual Plan estimates

**Sources** Planning Commission (2002); *Tenth Five-year Plan 2002-07*

scale down the tariff increase in some consumer categories, however, it is seen that in some of these states the government did not release this subsidy even when the financial year was over. Some commissions have also recognized this fact in their tariff orders issued for the utilities. For example, the KERC (Karnataka Electricity Regulatory Commission) has recognized in its tariff order for 2003 that it has been urging the state government to try and release subsidy payments at least in equal quarterly instalments, but this was not followed. The subsidy due to the KPTCL (Karnataka Power Transmission Corporation Ltd) as on 31 March 2003 was 2716.8 million rupees. The KERC has also emphasized that the state government needs to make subsidy payments regularly, as lumpsum one-time

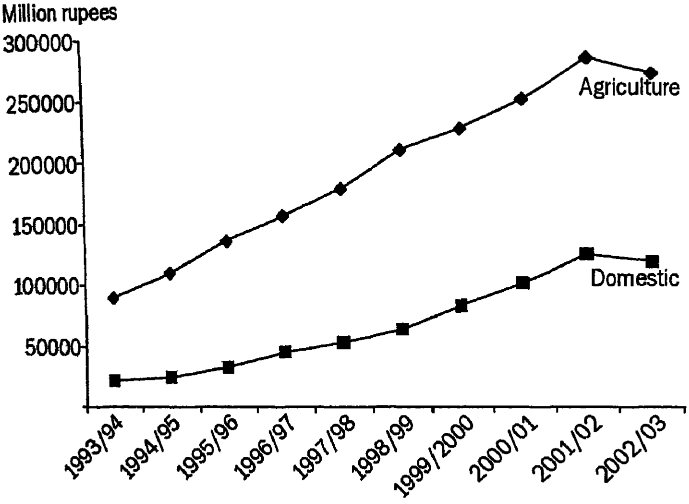

**Figure 6** Trend in agriculture and domestic subsidy
**Source** Planning Commission (2002)

payments affect the cash flow of the utility. If this experience persists, the objective of ensuring that the utilities are protected from government actions on tariff will not be achieved.

Figure 6 illustrates the trend in agriculture and domestic subsidy in the power sector. It shows that the subsidy to the agriculture and the domestic sector has been increasing over the years, even in the post-reform period. However, the growth rate of agricultural subsidy has declined from 18.45% (CAGR [compound annual growth rate] from 1993/94 to 1997/98) to 10.77% [CAGR from 1998/99 to 2001/02). For the domestic sector, these growth rates are 25.34% and 24.56%, respectively.

With the beginning of the tariff rationalization process, agricultural tariffs have been increased in many states. Tamil Nadu was the last state to offer free power to the farmers following Punjab's decision to charge agricultural consumers, though the small farmers in Tamil Nadu are still getting subsidy. The decisions taken in these states to impose a nominal charge for electricity supply to farmers mark an end to the regime of free power supply to agriculturists in the country. Even though agricultural tariffs have been pegged at very nominal levels in these two states, the step taken to charge farmers for the power they use is the first step in reducing the long-prevalent cross-subsidization in the power tariff system. The issue of tariff rebalancing is discussed in greater detail later in this publication.

## Plant load factor

The overall annual PLF (plant load factor) of thermal power stations in the country increased to 69.9% in 2001/02 from 64.6% in 1998/99. The improvements in the overall PLF of the state and central sector stations during pre-reform and post-reform years are given in Table 7.

The improvement has been particularly noticeable in the state sector, though considerable interstate variations persist, for example, in Assam and Bihar the average PLF is

**Table 7** Annual plant load factor of central and state sector stations (%)

| Year | *Central* | *State* | *Overall* |
|---|---|---|---|
| 1992/93 | 62.7 | 54.1 | 57.1 |
| 1993/94 | 69.8 | 56.6 | 61.0 |
| 1994/95 | 69.2 | 55.0 | 60.0 |
| 1995/96 | 70.9 | 58.0 | 63.0 |
| 1996/97 | 71.0 | 60.3 | 64.4 |
| 1997/98 | 70.4 | 60.9 | 64.7 |
| 1998/99 | 71.1 | 60.8 | 64.6 |
| 1999/2000 | 73.8 | 63.7 | 67.3 |
| 2000/01 | 74.3 | 65.6 | 69.0 |
| 2001/02 | 74.3 | 67.0 | 69.9 |

**Source** Planning Commission (2002)

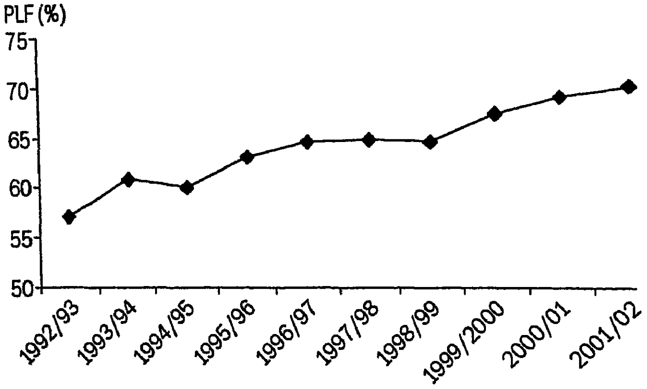

**Figure 8** Trend of PLF (plant load factor) (%) all India
**Source** Planning Commission (2002)

below 40%, whereas states like Andhra Pradesh, Karnataka, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, and Uttar Pradesh have a PLF higher than 70%. Figure 7 gives the trend of PLF from 1992/93 to 2001/02.

Table 8 gives the PLF in some of the states over the past few years.

**Table 8** Plant load factor in select states

| States | *1998/99* | *1999/2000* | *2000/01* | *2001/02* |
|---|---|---|---|---|
| Assam | 18.7 | 18.2 | 18.5 | 16.8 |
| Bihar | 22.5 | 19.7 | 15.4 | 14.5 |
| Karnataka | 81.7 | 82.3 | 81.3 | 81.1 |
| Madhya Pradesh | 67.8 | 69.4 | 66.6 | 63.0 |
| West Bengal | 36.8 | 39.8 | 36.0 | 38.3 |

**Source** Planning Commission (2002)

However, the extent to which these improvements can be attributed to the regulatory reform process has not been estimated as yet. An interesting case is that of Uttar Pradesh where the PLF levels have improved substantially in the post-reform period (Box 4).

### **Box 4** Performance review: UPRVUNL (Uttar Pradesh Rajya Vidyut Utpadan Nigam Ltd)

The tariff order issued by the UPERC (Uttar Pradesh Electricity Regulatory Commission) for 2002/03 recognizes an improvement in the performance of state generators in terms of an increase in the overall PLF. The overall PLF has improved from 50.73% in 1997/98 to 59.8% in 2001/02 and 62.4% in 2002/03 (up to August 2002) as is evident from the table below.

PLF of UPRVUNL (%)

| 1996/97 | 1997/98 | '98/99 | 1999/2000 | 2000/01 | 2001/02 |
|---|---|---|---|---|---|
| 50.51 | 50.73 | 47.88 | 53.36 | 57.20 | 59.80 |

The trend in PLF in the pre-reform period is given in the table below.

| 1992/93 | 1993/94 | 1994/95 | 1995/96 |
|---|---|---|---|
| 50.50 | 50.30 | 43.90 | 47.30 |

**Sources** UPPCL (Uttar Pradesh Power Corporation Limited) Tariff Order 2002/03; Planning Commission (2002)

The PLF levels were relatively low during 1992/93 to 1995/96 and showed a declining trend, especially in 1994/95. The increase in the post-reform period has been swift with the overall PLF improving by 6% from 53.36% in 1999/2000 to 59.80% in 2001/02. It was due to this improvement in PLF that the UPRVUNL was able to exceed its target of sending 17 525 MU (million units) to UPPCL by 509 MU in 2001/02.

# Rationalization of electricity tariffs

Since the early 1990s, the power sector in India has been going through a process of reforms and restructuring. One of the major problems in this sector is the irrational tariff structure. Before the setting up of regulatory commissions at the state levels, the tariffs were fixed and realized by the SEBs (state electricity boards) and electricity departments. However, state governments have constantly interfered in this process to provide concessional tariffs to certain sectors, mainly agriculture and domestic consumers. These sectors are generally cross-subsidized by the commercial and industrial sectors and also directly subsidized by the government. At the same time, the SEBs are not adequately subsidized for this loss in revenue and they have been incurring heavy losses. The attempt to make up for these losses by raising industrial tariffs has led to an increasing migration out of the grid through the captive generation route. As a result, the financial position of the SEBs has been deteriorating every year.

The importance of initiating power sector reforms and the need for tariff rationalization was first recognized by the Committee on Power, constituted in 1992 by the National Development Council. This committee was constituted to evaluate the working of the power sector in India and to examine *inter alia* the measures to make the SEBs viable by taking appropriate measures. The committee submitted its report on 10 March 1995. Some of the major issues raised in the report were as follows (*Ninth Five-year Plan, 1997–2002*, Volume II, p. 692, paragraph 6.87).

- Restoration of the autonomy and professionalism of the state power utilities and allowing such utilities to have tariff structures that would generate adequate resources for the SEBs
- Setting up of tariff boards at the national and regional levels for regulating the tariff policies of public and private utilities. The minimum agriculture tariff should gradually be increased so that it is not less than 50% of the cost of supply.

In the meantime, it was also recognized that a plan for the power sector reforms could not be designed and implemented without the consensus and active participation of the state governments. Accordingly, discussions were held with the chief ministers of the states and union territories and the CMNAPP (Common Minimum National Action Plan on Power) was agreed upon in December 1996. The Plan reiterated that rationalization of tariffs was one of the steps that was needed to be taken up urgently and in this context stated as below (*Ninth Five-year Plan, 1997–2002*, Volume II, p. 756, Annexure 6.1).

- Cross-subsidization between categories of consumers may be allowed by the SERCs (state electricity regulatory commissions). No sector shall, however, pay less than 50% of the average cost of supply (cost of generation plus transmission and distribution). Tariffs for agricultural sector will not be less than 50 paise per kilowatt-hour to be brought to 50% of the average cost in not more than three years.
- Recommendations of the SERCs are mandatory. If any deviations from tariffs recommended by the SERC are made by a state/union territory government, it will have to provide for the financial implications of such deviations explicitly in the state budget.

There has been a continuous emphasis on the need to rationalize tariffs and reduce the levels of cross-subsidy ever since reforms were initiated. Section 29 of the ERC (Electricity Regulatory Commissions) Act (1998), which discusses the determination of tariff by state commissions, states that (Section 29[2]) the state commission shall determine by regulations the terms and conditions for the fixation of tariff, and in doing so, shall be guided by the following, namely

- (c) *that the tariff progressively reflects the cost of supply of electricity at an adequate and improving level of efficiency.*

Thus, one of the most important objectives of setting up regulatory commissions was to rationalize tariffs. This has been stressed in all the official documents, which discuss their role. At present, 22 states[′] have either constituted or notified the constitution of SERCs and many of these have already issued their first tariff orders. In the context of the rationalization of tariffs, it becomes imperative to evaluate the extent these commissions have been able to achieve this. The following CI (convergence index) medium has been used to measure the extent to which the average realization from each category converges towards the overall average realization.

$$CI_1 = \sqrt{\left\{ \Sigma \left( \frac{AR_c}{OA_r} - 1 \right)^2 F_c / \Sigma F_c \right\}}$$

where

$CI_1$ = convergence index based on average realization

$AR_c$ = average realization of each consumer category (rupees per kilowatt-hour)

$OA_r$ = overall average realization (rupees per kilowatt-hour)

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[′] Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttaranchal, Uttar Pradesh, and West Bengal

$F_c$ = revenue from each consumer category (million rupees)

Any improvement in terms of tariff rationalization will get reflected in a reduction in this index after a change in tariffs by the regulator. Hence, the index has tried to capture the movement of the realization from each category to the overall average realization, i.e. the extent to which each category pays the same tariff. If for all consumer categories, the average tariffs are equal, then the ratio of these two ($AR_c/OA_r$) will be 1 and hence the CI will become zero. Such an index can give perverse findings if the HT (high tension) tariffs are below the average cost and LT (low tension) tariffs are above the average cost. Since this does not hold true for the present case, it can be expected that no perverse findings will be reported.

In the CI detailed above, the ratio of the average realization from each consumer category has been taken from the overall average realization and not from the average cost of supply. This has been done because, in a number of states, the regulator has left uncovered revenue gaps, and hence, the total revenue generated through tariffs does not meet the entire revenue requirement. In these cases, the average realization from tariff and the average cost of supply are different. This would make comparisons across states difficult. In this analysis, an attempt has been made to estimate the convergence in tariffs towards the average tariff, so that there is a greater degree of comparability.

Ideally, the average realization from each consumer category should be equal to the cost incurred in serving that category. Thus, if a voltage-wise classification is used, the average tariff from each category should equal the cost at the respective voltage level. Therefore, the ideal approach for determination of tariffs is not based on average costs, as cost of supply is different at different voltage levels.

However, there are two major constraints in using voltage-wise costs. Firstly, reliable data on voltage-wise costs are not available in many cases. Secondly, it is evident that the cost of supply for LT consumers would be higher while that for HT consumers would be lower. At the same time, the tariffs for LT consumers (except in a few categories like commercial consumers) are generally lower than that for HT consumers. Thus, tariff determination on the basis of voltage-wise costs would entail that LT tariffs are increased to a great extent and HT tariffs are reduced. However, this might be difficult to achieve in the current scenario and as a first step it would be feasible to equate the tariff of each category to the overall average realization.

Thus, as better information and data become available, indices based on average costs and voltage-wise cost of supply could be used. These are as follows.

$$CI_2 = \sqrt{\left\{ \Sigma \left( \frac{AR_c}{AC_r} - 1 \right)^2 F_c / \Sigma F_c \right\}}$$

where

$CI_2$ = convergence index based on average cost of supply
$AR_c$ = average realization of each consumer category (rupees per kilowatt-hour)
$AC_r$ = average cost of supply (rupees per kilowatt-hour)
$F_c$ = revenue from each consumer category (million rupees)

$$CI_2 = \sqrt{\left\{ \Sigma \left( \frac{AR_c}{VC_r} - 1 \right)^2 F_c / \Sigma F_c \right\}}$$

where

$CI_3$ = convergence index based on voltage-wise cost of supply

$AR_c$ = average realization of each consumer category (rupees per kilowatt-hour)
$VC_r$ = cost of supply of the particular consumer category, i.e., LT, HT, or EHT (rupees per kilowatt-hour)
$F_c$ = revenue from each consumer category (million rupees)

As more data become available, it would be possible to compute these indices too. Another issue that needs to be addressed in this context is that of agricultural tariffs. In the past, in a number of states, the agricultural sector was provided free electricity and in many cases agricultural consumers were being supplied electricity at subsidized tariffs. However, a trade-off takes place between lower tariffs and poor quality of supply in terms of supply primarily during off-peak hours, lesser hours of supply, etc. Given this background, if agricultural consumers are given a tariff rebate for consumption during off-peak hours, as is done in many cases for industrial consumers, then this would have to be incorporated in the estimation of the CI. One way of doing this would be to equate the off-peak rate with the normal rate and then calculate the average realization from the category. For example, if the off-peak agricultural tariff is fixed at 0.75 rupee per unit and the normal tariff is 1 rupee per unit, then for calculation purposes, it will be assumed that 1 rupee per unit is the tariff paid by the consumers during off-peak hours too. However, once again since there are no estimates of what would be the 'ideal' tariff for agriculture, taking into account the quality and time of supply, the average tariff has been used as the benchmark.

In the case of agriculture, and in some cases domestic tariff too, the government gives subsidy to keep the tariffs low. Accordingly, the calculations have been made taking into consideration both tariffs, namely with and without subsidy.

The figures including subsidy represent the tariffs as determined by the commission; they take into account the actual amounts paid by the consumers and the subsidy paid by the government. These figures would represent the amount of tariff rebalancing done by the regulators. The figures excluding the subsidy represent the tariffs paid by consumers without taking into account the amount of subsidy. This would represent the extent of tariff rebalancing that has been done at the consumer's end.

It is necessary to calculate the pre-subsidy figures even when subsidy has been given. This is because the sustainable level of subsidy is also a question. High levels of subsidy may protect the utilities financially, however, if these are not fiscally maintainable, then it will only be a matter of time before the utilities feel the impact—both by way of cash-flow interruptions as well as the broader impact of a weak government on economic growth and hence electricity sales.

Since an analysis of the fiscal position of the state governments is beyond the scope of this publication, only pre-subsidy figures and post-subsidy figures are given.

As far as the issue of T&D (transmission and distribution) loss and sales data is concerned, the CI has been calculated after the regulatory commissions were established. Therefore, in most cases, the actual levels of losses and, consequently, realistic sales levels for agriculture were recognized by the commissions in their respective tariff orders, which are the main source of information for calculating this index.

For the purpose of this exercise, sales to retail consumer categories have been taken into consideration and the categories of bulk supply, licensees, sanction holders, etc. have been left out. The states have been selected on the basis of the following criteria.

- States that have issued at least two tariff orders—Andhra Pradesh, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Orissa, and Uttar Pradesh.

- States like Gujarat where public and private sectors co-exist. Such a comparison would highlight the difference in improvement, if any, in public sector versus the private sector.

## Analysis of tariff rebalancing by state

### Gujarat

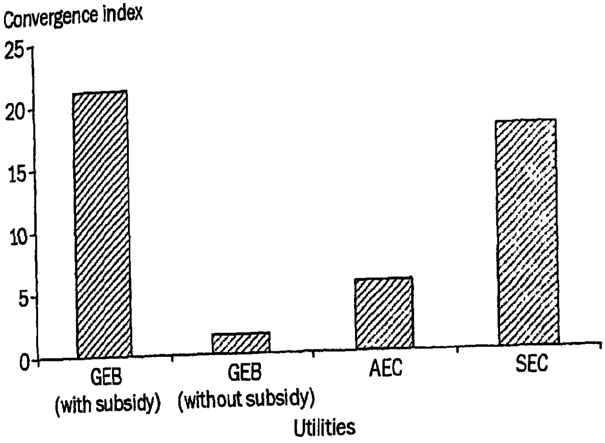
In Gujarat, the CI has been calculated for three utilities, namely the GEB (Gujarat Electricity Board), the AEC (Ahmedabad Electricity Company) Ltd, and the SEC (Surat Electricity Company) Ltd. Of these, the AEC and the SEC are in the private sector while the GEB is in the public sector. Thus, this analysis gives a comparison of the public and private sectors.

The results of the analysis for each of the three entities are given in Table 1.

Figure 1 shows the comparative picture of the improvements in the CI of the three entities. It can be seen that the improvement is maximum in the GEB when subsidy given by the state government is also considered. This improvement falls from 21.17% (with subsidy) to only 1.57%, if the subsidy component is not taken into account. Between the two private players, the improvement in CI in Surat (17.57%) is higher than that in Ahmedabad (5.51%).

**Table 1** Trend in CI (convergence index) in GEB (Gujarat Electricity Board), AEC (Ahmedabad Electricity Company) Ltd, and SEC (Surat Electricity Company) Ltd

| | *CI* | | |
|---|---|---|---|
| Utility | *Existing* | *Approved* | *Change (%)* |
| GEB (Tariff Order 2001/02) | | | |
| With subsidy | 0.7512 | 0.5922 | −21.17 |
| Without subsidy | 0.7512 | 0.7394 | −1.57 |
| AEC (Tariff Order 2002/03) | 0.1554 | 0.1469 | −5.51 |
| SEC (Tariff Order 2002/03) | 0.1182 | 0.0974 | −17.57 |



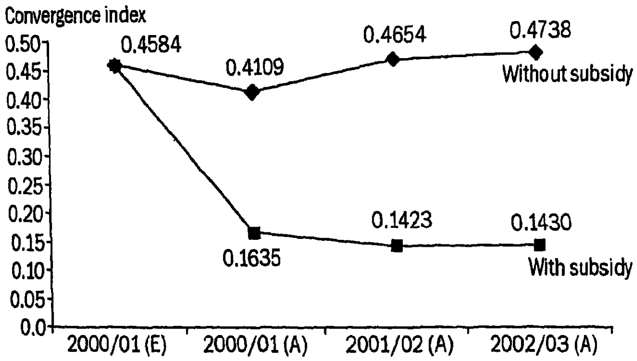
GEB – Gujarat Electricity Board; AEC – Ahmedabad Electricity Company; SEC – Surat Electricity Company

*Note* Convergence index figures for AEC and SEC are 'without subsidy'

**Figure 1** Comparison of improvement in convergence index in Gujarat

### *Haryana*

Figure 2 indicates the trend in CI for Haryana from 2000/01 to 2002/03. The trend in the change in CI is given in Table 2. It is thus seen that in Haryana, there has not been any



E – existing; A – approved

**Figure 2** Trend in convergence index in Haryana

**Table 2** Trend in the change in CI (convergence index) in Haryana

| Haryana | *Change in CI (%)*<br>*2000/01* | <br>*2001/02* | <br>*2002/03* |
|---|---|---|---|
| With subsidy | –64.34* | –12.95 | +0.51 |
| Without subsidy | –10.35 | +13.25 | +1.81 |

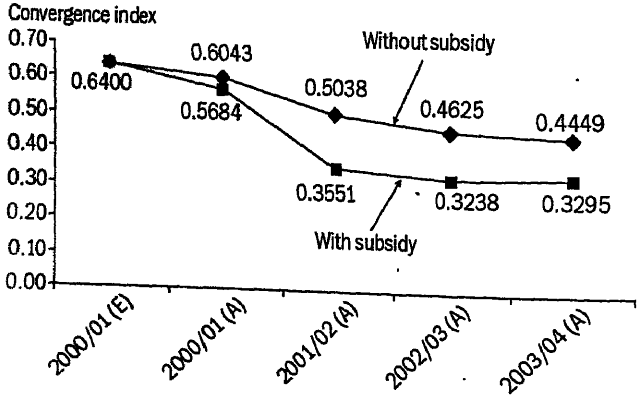
* The state government had agreed to provide a subsidy of 6130.8 million rupees to the utility for the agricultural sector; however, of this amount 4748.6 million rupees has still not been received by the utility.
**Source** Tariff Order (2002/03).

improvement in 2002/03, instead there is a positive increase in CI, which implies deterioration.

### *Uttar Pradesh*

Figure 3 gives the trend in CI for Uttar Pradesh from 2000/01 to 2002/03.

The trend in the change in CI is given in Table 3. In Uttar Pradesh, there has been a consistent decline in the CI



E – existing; A – approved
Figure 3 Trend in convergence index in Uttar Pradesh

**Table 3** Trend in the change in CI (convergence index) in Uttar Pradesh

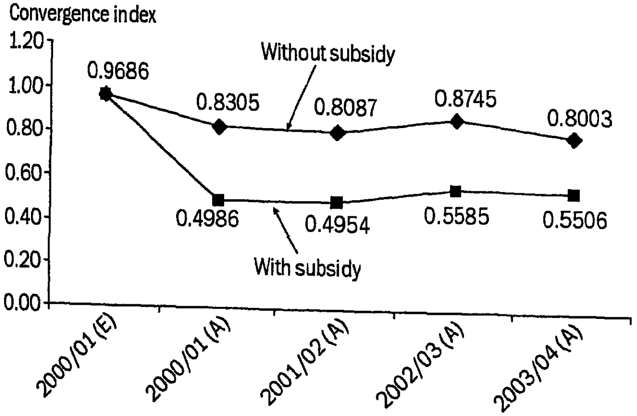
| | *Change in CI (%)* | | | |
|---|---|---|---|---|
| Uttar Pradesh | *2000/01* | *2001/02* | *2002/03* | *2003/04* |
| With subsidy | −11.19 | −37.52 | −8.82 | −7.23 |
| Without subsidy | −5.59 | −16.64 | −8.19 | −3.80 |

implying an improvement, both when subsidy is taken into consideration and otherwise.

### *Andhra Pradesh*

Figure 4 gives the trend in CI for Andhra Pradesh from 2000/01 to 2003/04. The trend in the change in CI is given in Table 4.

In Andhra Pradesh, 2000/01 (first Tariff order) saw the maximum improvement in terms of a fall in the CI of 48% with subsidy and 14% without subsidy. In 2002/03, there was deterioration with an increase in the CI of 12.73% with



E – existing; A – approved

**Figure 4** Trend in convergence index in Andhra Pradesh

**Table 4** Trend in the change in CI (convergence index) in Andhra Pradesh

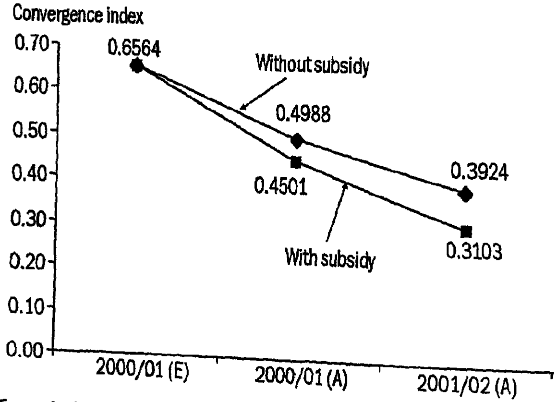
| | *Change in CI (%)* | | | |
|---|---|---|---|---|
| Andhra Pradesh | *2000/01* | *2001/02* | *2002/03* | *2003/04* |
| With subsidy | −48.53 | −0.63 | 12.73 | −1.42 |
| Without subsidy | −14.26 | −2.62 | 8.13 | −8.48 |

subsidy and 8.13% without subsidy. As per the details in the Tariff Order 2003 issued by the APERC (Andhra Pradesh Electricity Regulatory Commission), there will be some improvement in the CI in 2003/04, as compared to the CI in 2002/03.

### *Maharashtra*

Figure 5 gives the trend in CI for Maharashtra for 2000/01 and 2001/02.

The trend in the change in CI is given in Table 5. In Maharashtra, there is a decline in the CI as per the information given in the two tariff orders issued by the



E – existing; A – approved

Figure 5 Trend in convergence index in Maharashtra

**Table 5** Trend in the change in CI (convergence index) in Maharashtra

| | *Change in CI (%)* | |
|---|---|---|
| Maharashtra | *2000/01* | *2001/02* |
| With subsidy | –31.43 | –31.07 |
| Without subsidy | –24.01 | –21.34 |

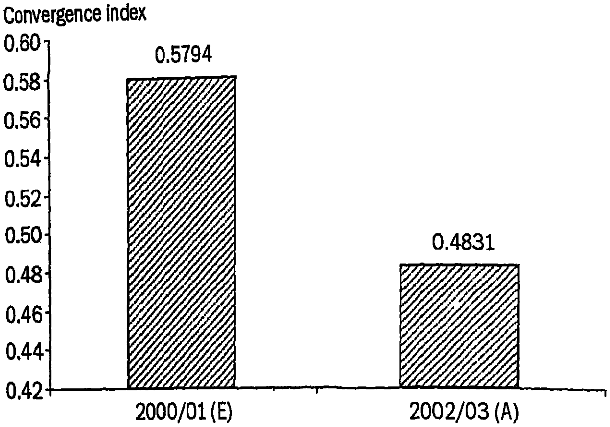
MERC (Maharashtra Electricity Regulatory Commission). However, it must be acknowledged here that in Maharashtra the revised norms for agricultural consumption were recognized by the MERC in its second tariff order as compared to other states where this was recognized in the first tariff orders. Hence, a part of the improvement in CI is also attributable to this.

### *Madhya Pradesh*

In Madhya Pradesh, till date the MPERC (Madhya Pradesh Electricity Regulatory Commission) has issued two tariff orders, one in 2001/02 and the other in 2002/03. In the analysis done for the purpose of this study, the CI has been calculated for 2001/02 as per existing tariffs and for 2002/03 as per tariffs approved by the MPERC. The CI for 2001/02, as per approved tariffs, could not be estimated due to lack of data.

Figure 6 gives the trend in CI for Madhya Pradesh for 2001/02 and 2002/03.

As far as improvement in the CI is concerned, Figure 6 shows that the CI has declined from 0.5794 in 2001/02 (existing tariffs) to 0.4831 in 2002/03 (approved tariffs). This implies an absolute reduction of 0.0963 in the CI over two years; i.e., a 16.63% decline. This represents an average yearly improvement of 8.31% in the CI.



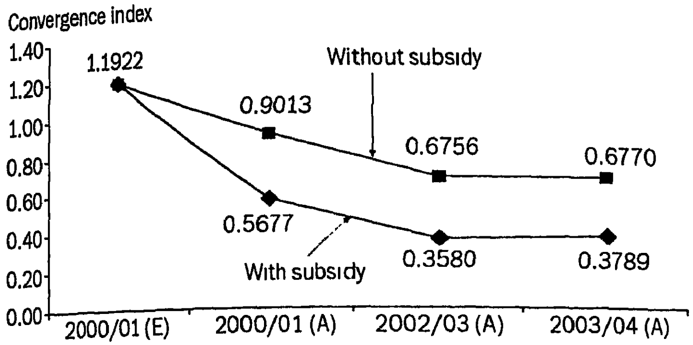
E – existing; A – approved

**Figure 6** Trend in convergence index in Madhya Pradesh

### *Karnataka*

Figure 7 gives the trend in CI for Karnataka for 2000/01, 2002/03, and 2003/04. The subsidy amount as approved by the KERC (Karnataka Electricity Regulatory Commission) in its various tariff orders has been taken for this analysis despite the fact that the state government has not released the entire amount due to the utility. Further, the entire subsidy has been proportionately divided among the categories of Bhagyajyothi/Kutirjyothi and agriculture (up to 10 HP).

The trend in the change in CI is given in Table 6. This section clearly brings out the fact that there was an improvement in the CI as per the tariff orders for 2000 and 2002. However, in 2003, there was an increase in the CI implying deterioration in the index.



E - existing; A - approved
**Figure 7** Trend in convergence index in Karnataka

**Table 6** Trend in the change in CI (convergence index) in Karnataka

| | *Change in CI (%)* | | |
|---|---|---|---|
| Karnataka | *2000/01* | *2002/03* | *2003/04* |
| With subsidy | –52.38 | –36.93 | +0.22 |
| Without subsidy | –24.40 | –25.05 | +4.28 |

## Impact of new tariff norms of the Central Electricity Regulatory Commission

### *Generation tariffs*

The impact of the new tariff norms of the CERC (Central Electricity Regulatory Commission) on the tariffs of the central sector generating companies has been discussed in this section. This has been assessed for four HE (hydroelectric) power generating projects – Chamera, Salal, Tanakpur, and Uri – for which the CERC has issued orders. For the purpose of analysis, the tariff for these has been estimated from the information and data available in the CERC order issued for each of these.

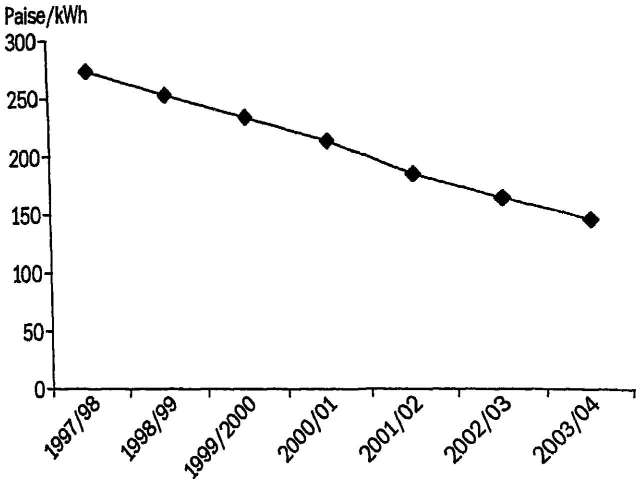


**Figure 8** Trend in tariff for Chamera hydroelectric project

### *Chamera*

Figure 8 gives the trend in tariff for the Chamera HE project from 1997/98 to 2003/04.

### *Salal*

Figure 9 gives the trend in tariff for the Salal HE project from 1997/98 to 2003/04.

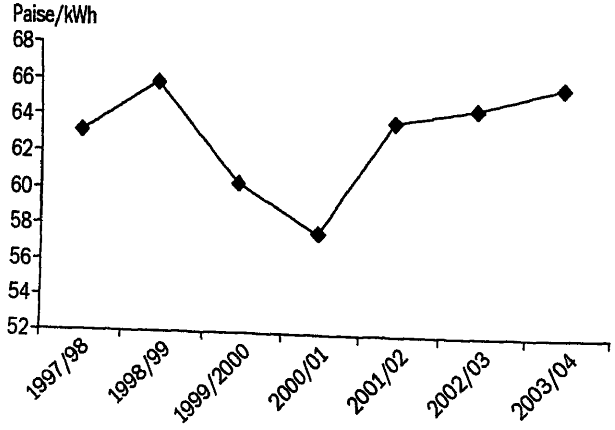


**Figure 9** Trend in tariff for the Salal hydroelectric project

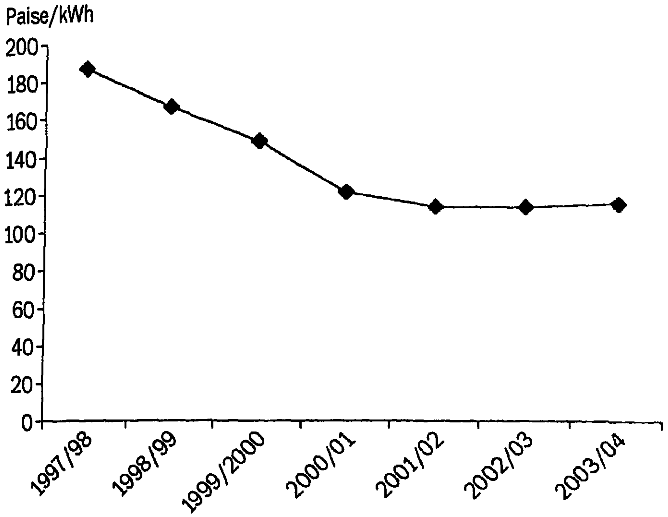


**Figure 10** Trend in tariff for the Tanakpur hydroelectric project

### *Tanakpur*

Figure 10 gives the trend in tariff for the Tanakpur HE project from 1997/98 to 2003/04.

### *Uri*

Figure 11 gives the trend in tariff for the Uri HE project from 1997/98 to 2003/04.

As is seen from the above figures, the tariffs for Uri show a declining trend from 2001/02 onwards. For Chamera, the tariffs have been continuously declining since 1997/98. However, for Tanakpur, the decline has been marginally reversed in 2003/04 with there being a small increase in tariff. Salal shows a sharp increase in tariff from 2001/02 onwards. It can thus be concluded that the tariffs as per the new norms have not made any significant impact in terms of a decline except in the case of Uri.

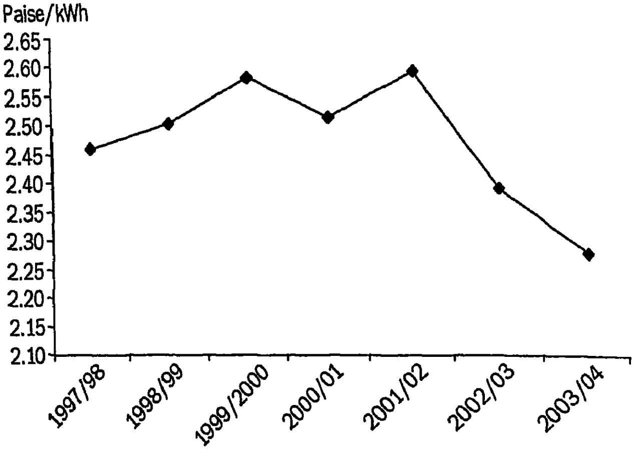


**Figure 11** Trend in tariff for the Uri hydroelectric project

### *National Thermal Power Corporation*

We now look at the impact of these new norms on the NTPC (National Thermal Power Corporation) Ltd. As per the 26th Annual Report (2001/02) of the NTPC Ltd, the tariff for 2001/02 was lower by 22 260.70 million rupees as compared to the pre-existing tariff-based calculations, whereas, the outlay for 2002/03 for capital schemes was 35 060 million rupees. It is thus observed that this reduction in tariffs is a substantial proportion of the capital outlay required. The impact of this has also been estimated at the state level. For Uttar Pradesh, this lower NTPC tariff would have led to a reduction in the aggregate revenue requirement for 2002/03 by about 3.93%, which is 3490 million rupees. However, these figures are tentative and the final figures can be calculated only after the CERC issues the final tariff orders.

### Conclusions

- There has been greater transparency in the power sector after the initiation of reforms, which is expected to lead to better performance.

- There is a need to develop and monitor quality of service standards.
- Most states show a sharp improvement in the CI initially. However, the improvement in the index declines gradually over time.
- Rebalancing at the consumer end is negated due to the subsidy provided by the government.
- Tariff rebalancing indices should be calculated in all tariff orders issued by the regulatory commissions, and should also be published in Planning Commission reports to ensure that these are easily available to the general public.
- Tariff rebalancing needs to be pursued further.

# Regulatory reforms in the telecom sector

## Background

The lack of telecommunications infrastructure in India was an oft-highlighted reason for the country's slow economic growth. Technological innovations were taking place across the globe and it was felt that a country's progress was directly linked to a well-developed telecom infrastructure. The pressure on the government to restructure the telecom sector resulted in the first liberalization initiative in 1984. Until then, the Indian telecom sector was the monopoly of the government and was characterized by under-investment, outdated equipment, and growth that was way beneath the actual potential.

The Government of India set up the Athreya Committee in 1990 for restructuring Indian telecommunications and another committee reviewed the Indian Telegraph Act of 1885 in 1992. Further, the government announced in 1991 that all services, other than basic services, would be opened up to private investment in July 1992. These services, termed value-added services, included cellular mobile telephone, radio paging, e-mail, videoconferencing, data services, video text and audio text services, and voice mail.

### *Government policies*

### National Telecom Policy of 1994

The NTP 94 (National Telecom Policy of 1994) heralded a new era in the Indian telecom sector with the intention to promote the expansion and improvement of India's basic telecommunications infrastructure, particularly to the underserved rural areas. The focus of this policy was on telecommunication for all and telecommunication within the reach of all. This meant ensuring the availability of telephone on demand as early as possible. Another basic objective of the policy was to achieve universal service covering all villages as early as possible. With regard to the quality of telecom services, the policy aimed to match world standards. Provision of the 'widest permissible range of services' at 'reasonable prices' was also explicitly stated in this policy.

In line with the objectives of NTP 94, the Eighth Five-year Plan targets were revised as follows.

- Telephone should be available on demand by 1997
- All villages should be covered by 1997
- In the urban area, a PCO (public call office) should be provided for every 500 persons by 1997
- All value-added services available internationally should be introduced in India to raise the telecom services in India to international standards well within the Eighth Five-year Plan period.

To implement this policy, suitable arrangements would be made to protect and promote the interests of the consumer as well as ensure fair competition.

### New Telecom Policy of 1999

Some of the main objectives of NTP 94 were not achieved. In addition, there were several other factors that necessitated a relook into the existing policy framework. New technologies, rapid growth, and the worldwide trends ushering in competition brought out the limitations of this policy as a comprehensive strategy for the sector. In addition, the convergence of both markets and technologies was propelling a realignment of the industry. In order to overcome the difficulties of NTP 94, and in view of the new developments, the government announced the NTP 99

(New National Telecom Policy 1999) in March 1999. This policy made several adjustments to the telecommunications regulatory framework. The main objectives of this policy were as follows.

- Availability of affordable and effective communications to the citizens to further the country's social and economic goals
- Strive to provide a balance between the provision of universal service to all uncovered areas, including the rural areas, and the provision of high-level services capable of meeting the needs of the country's economy
- Encourage development of telecommunication facilities in remote, hilly, and tribal areas of the country
- Convert PCOs, wherever justified, into public teleinfo centres having multimedia capability like ISDN services, remote database access, government and community information systems, etc.
- Provide a competitive environment in both urban and rural areas offering equal opportunities and level playing field for all players in a time-bound manner.

Corresponding to these objectives, some of the specific targets laid down in NTP 99 are as follows.

- Make available telephone on demand by 2002 and subsequently increase telephone connections so as to achieve a teledensity of 7 by 2005 and 15 by 2010
- Increase rural teledensity from the current level of 0.4 to 4 by 2010 and provide a reliable transmission media in all rural areas
- Achieve telecom coverage of all villages in the country and provide reliable media to all exchanges by 2002
- Provide Internet access to all district headquarters by 2000
- Provide high-speed data and multimedia capability using technologies including ISDN to all towns with a population greater than 0.2 million by 2002.

Some of the notable advances marked by the NTP 99 are as follows.

- The FSP (fixed service providers) were freely permitted to establish 'last mile' linkages to provide fixed services and carry their own intra-circle traffic without seeking an additional licence.
- Operators were allowed to connect to any other service provider, including another cable service provider, which was not allowed earlier.
- Direct interconnectivity to VSNL (Videsh Sanchar Nigam Ltd) allowed after opening up of the domestic long distance.
- Direct interconnectivity between the licensed service provider and any other type of service provider in their area of operation and sharing of infrastructure with any other type of service provider made possible.

To address the problems of the existing licensees, a migration scheme was separately announced by the government in July 1999, which provided an opportunity to the existing licensees to opt for migration to NTP 99 regime. The main features of this scheme included the following (TRAI 2000).

- Bids for new licenses in the circles would be invited under the new licensing regime, i.e. a one-time entry fee and a percentage share of revenue as license fee. The number of operators and the percentage share of revenue would be based on TRAI's (Telecom Regulatory Authority of India) recommendations.
- Existing licensees would also pay the same percentage share of revenue as the annual license fee, as applicable to new licensee(s) in the same service area. The license dues payable up to 31 July 1999 under the previous license regime would be treated as the entry fee for the existing operators. The new operators would bid for the entry fee.

## Regulatory reforms

One of the biggest impediments to the success of NTP 94 was the lack of an effective and autonomous regulatory authority, with clear lines of jurisdiction, for implementing the telecom policy. Hence, a comprehensive bill, titled Telecom Regulatory Authority of India Bill (1995), was prepared and TRAI came into being in 1997.

TRAI was set up to

- protect the interests of the consumers,
- regulate telecom tariffs,
- settle disputes between service providers,
- ensure compliance of licence conditions,
- bring about technical compatibility and inter-connection between different service providers,
- regulate arrangements among service providers in respect of sharing of revenue,
- levy fees,
- facilitate competition,
- promote efficiency,
- provide a level playing field for fair competition among the public and private operators, and
- give further content to the universal service obligation (MoF 1996/97).

Many orders and decisions of TRAI were challenged, and there was a growing number of cases in court involving TRAI, the private operators, and the DoT (Department of Telecommunications). While a critique of these issues would be interesting, it is beyond the scope of this publication.

TRAI was reconstituted in 2000 through an ordinance and a smaller body without judicial powers was formed. A clear distinction was made between its advisory and regulatory functions. The amendment to the TRAI Act made it mandatory for the government to seek recommendations of TRAI on issues like the need and timing of new service providers and the terms and conditions applicable to them. However, such recommendations would not be binding on the government. TRAI's orders on tariffs and the terms and conditions of interconnectivity would, however, be binding, irrespective of anything contained in license agreements issued prior to the ordinance.

A separate dispute settlement and appellate body, the Telecom Disputes Settlement and Appellate Tribunal was set up to adjudicate any dispute between a licensor and a licensee, among service providers, and between a service provider and a group of consumers. It would also hear and dispose of any appeals against the decisions of the new TRAI.

The government is the policy-maker and licensor of services. It determines the extent as well as the introduction of competition in the various segments of the telecom sector. As mentioned above, the regulator makes recommendations to the government on issues like the need and timing of introduction of new service providers as well as the terms and conditions of licenses. Competition has been introduced in phases in the sector and several other steps have been taken in the course of regulatory reforms. Figure 1 gives a snapshot of the regulatory reforms in the sector.

## Effectiveness and efficiency of regulatory reforms

The key parameters that would demonstrate the effectiveness and efficiency of regulatory reforms include the growth of service in terms of subscriber numbers, spread of service in terms of availability, tariff rebalancing, QoS (quality of service) being made available to consumers, existence of level playing field, and growth of investment in the sector. In the past, availability and affordability have always been considered and talked about in the context of basic telecom services. Policies, when emphasizing the goals

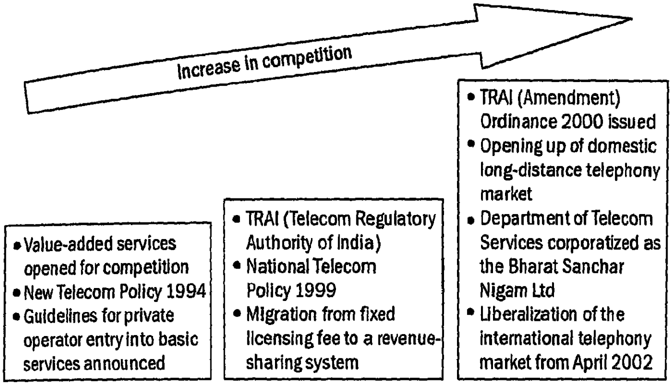

Increase in competition
• Value-added services opened for competition
• New Telecom Policy 1994
• Guidelines for private operator entry into basic services announced
• TRAI (Telecom Regulatory Authority of India)
• National Telecom Policy 1999
• Migration from fixed licensing fee to a revenue-sharing system
• TRAI (Amendment) Ordinance 2000 issued
• Opening up of domestic long-distance telephony market
• Department of Telecom Services corporatized as the Bharat Sanchar Nigam Ltd
• Liberalization of the international telephony market from April 2002

**Figure 1** Regulatory reforms in the telecom sector in India

of availability and affordability, also implicitly stress on basic telecom services.

However, voice services, other than basic services were also introduced by way of policy. Over the years, there has been a rapid increase in the number of subscribers of cellular services. In fact, in some places, the penetration of cellular services has bypassed that of basic services. Moreover, the regulator has the mandate of regulating various aspects of this service as well. In view of this, this study focuses equally on the availability as well as affordability of both basic and cellular services.

## Decision-making

### *Transparency and public participation*

At the heart of the reforms process and the creation of a regulatory authority was the objective of introducing more transparency in the decision-making process. Prior to reforms and the creation of the regulator, activities like tariff setting were conducted behind closed doors. The general public was neither informed of nor involved in any decision-making activity. There was no forum for utilities or the public to express their views or to demand information that led to consequent decisions. Hence, one of the important tasks that lay in front of the regulator was to induce openness in decision-making and invite public participation.

The stakeholders interviewed by us and our own analyses reveal that the processes and procedures adopted by the regulator in its functioning have been highly successful in bringing about transparency in decision-making. TRAI has generally been following a transparent and consultative approach in its decisions, tariff review exercises, recommendations, etc. Consultation papers have been issued by TRAI on various matters from time to time.

Regulatory reforms have brought about greater awareness on various issues in the sector. Further, considering the complexity and the scale of regulatory process, there has been a significant improvement in the public awareness about the regulatory process. Besides this, the ordinary citizen has also found a forum to express his/her views and at the same time inform the regulator on various subjects (Box 1). There is a provision whereby consumer organizations are registered with the regulator and have access to various consultation documents. This has been part of the regulator's attempts to play a role in the education of these bodies and, hence, create awareness. Moreover, in the post-reform years, access of the public to data and information has increased substantially.

At the same time, service providers have also got an opportunity to be an integral part of the decision-making process. Service providers from various segments of the industry have been able to openly discuss their views on various matters and the problems likely to be faced by them. Often, the regulator has also held informal discussions with groups of service providers to discuss the problems that would be faced by them in the implementation of certain issues, leading to greater transparency of processes.

Transparency and public participation has not been restricted to the activities of the regulator. The government has also followed the practice of consultations with

**Box 1** Regulatory reforms, transparency, and public participation

TRAI's (Telecom Regulatory Authority of India) first consultation paper related to concepts and methodologies for telecom pricing. At the end of the consultation process, a strong consensus emerged that tariff rebalancing was imperative and could not be delayed. On that basis, TRAI undertook a study of the telecom pricing structure with a view to proposing a new tariff regime. The second consultative paper on telecom tariff was a result of that study. This was the first exercise of its kind in India where all information and analysis relating to tariff setting of telecommunications services was publicly shared.

**Source** Kathuria (2001)

stakeholders. NTP 99 was formulated after a comprehensive and transparent consultative process where as many as 27 000 responses were received from concerned stakeholders.[1] Further, various documents are put on the web site of DoT from time to time and comments invited from all. For example, comments and suggestions have been sought on the draft tender document for subsidy support towards replacement of MARR (Multi Access Radio Relay) VPTs (village public telephones).

## Recommendations to the government

The TRAI Act lays down that on issues related to the need and timing of new service providers, and the 'terms and conditions of license to a service provider', the regulator must provide its recommendations to the government within 60 days from the date on which the recommendations have been sought. However, in actual practice, the regulator has generally not adhered to this time frame.

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[1] T V Ramachandran, Director General, Cellular Operators Association of India. The Indian Cellular Mobile Sector: Activities & Concerns. 13 June 2002, Bangkok. <www.itu.int/ITU-D/pdf/4597-11.1-en.pdf>

Discussion with stakeholders and our own analysis lead us to believe that this is not an area of concern for the stakeholders. The consultative process followed by the regulator is time-consuming. Not only does it lead to more transparency in the work of the regulator, but also improves the quality of recommendations provided. Thus, the output produced by this consultative process and the merits of the process itself outweigh the fact that the recommendations are provided to the government after a period of 60 days.

### Availability of services

At the start of the reforms, the low teledensity in the country was a major issue of concern. NTP 94 stated that teledensity was about 0.8. In particular, the teledensity in rural areas was abysmally low—less than 0.1. One of the main objectives of reforms is to increase the teledensity in the country, especially in rural areas, where NTP 99 targets a teledensity of 4 by 2010. Thus, one of the main tasks of the regulatory reforms has been to ensure the penetration of affordable telecommunications services in the country. Figure 2 shows the improvement in teledensity since 1995.

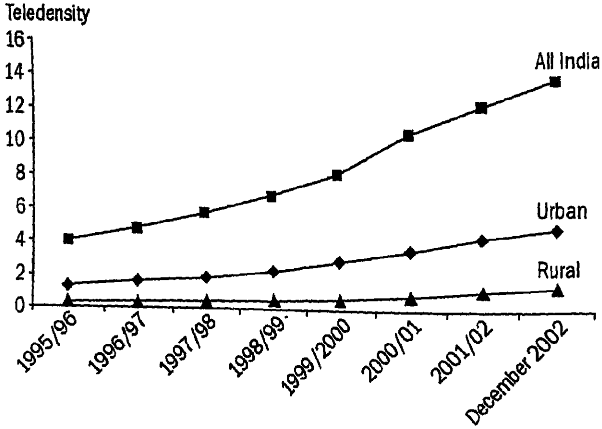

**Figure 2** Teledensity since 1995

**Table 1** Ratio of urban to rural teledensity

| Year | *Urban teledensity* | *Rural teledensity* | *Ratio of urban teledensity to rural teledensity* |
|---|---|---|---|
| 1995/96 | 4.0 | 0.3 | 13.33 |
| 1996/97 | 4.8 | 0.3 | 16.00 |
| 1997/98 | 5.8 | 0.4 | 14.50 |
| 1998/99 | 6.9 | 0.5 | 13.80 |
| 1999/2000 | 8.2 | 0.7 | 11.71 |
| 2000/01 | 10.6 | 0.9 | 11.78 |
| 2001/02 | 12.2 | 1.2 | 10.17 |
| December 2002 | 13.7 | 1.4 | 9.78 |

Overall the teledensity has increased from 0.8 in 1994 to 4.9 in December 2002. In rural areas, teledensity has more than quadrupled between 1994 and December 2002. Moreover, with the current CAGR (compound annual growth rate) of 31.6%, rural teledensity will reach 10.25 by 2010. This implies that the target of NTP 99 will be well achieved.

In addition, it would be useful to examine whether there has been a balanced spread of services between urban and rural areas. The ratio of urban to rural teledensity would provide an assessment of the extent to which such balanced growth has taken place. It can be seen from Table 1 that this ratio has been declining since 1996/97. What is noticeable, however, is that while this ratio has been declining, in absolute terms, the gap between urban and rural teledensity has been increasing.

While teledensity gives a broad picture of the availability of telecommunication service, there is need to examine the availability of telecommunication services by using parameters that present a more detailed picture. The number of households having a telephone is one such parameter (Table 2).

## Table 2 Households having telephone in 2001

| State/ Union Territory | *Total number of households* | *Number of households having telephone* | *Rank* | *Proportion of households* | *Rank* |
|---|---|---|---|---|---|
| **India** | **191 963 935** | **17 549 991** | – | **9.1** | – |
| Lakshadweep | 9·240 | 5 601 | 33 | 60.6 | 1 |
| Delhi | 2 554 149 | 886 608 | 9 | 34.7 | 2 |
| Chandigarh | 201 878 | 64 768 | 23 | 32.1 | 3 |
| Goa | 279 216 | 81 372 | 22 | 29.1 | 4 |
| Andaman and Nicobar Islands | 73 062 | 15 348 | 31 | 21.0 | 5 |
| Pondicherry | 208 655 | 39 804 | 24 | 19.1 | 6 |
| Kerala | 6 595 206 | 1 257 615 | 6 | 19.1 | 7 |
| Punjab | 4 265 156 | 807 629 | 10 | 18.9 | 8 |
| Himachal Pradesh | 1 240 633 | 204 684 | 17 | 16.5 | 9 |
| Daman and Diu | 34 342 | 5 388 | 34 | 15.7 | 10 |
| Mizoram | 160 966 | 22 745 | 27 | 14.1 | 11 |
| Maharashtra | 19 063 149 | 2 686 081 | 1 | 14.1 | 12 |
| Sikkim | 104 738 | 13 792 | 32 | 13.2 | 13 |
| Karnataka | 10 232 133 | 1 307 008 | 5 | 12.8 | 14 |
| Haryana | 3 529 642 | 448 796 | 13 | 12.7 | 15 |
| Gujarat | 9 643 989 | 1 202 761 | 7 | 12.5 | 16 |
| Tamil Nadu | 14 173 626 | 1 592 540 | 2 | 11.2 | 17 |
| Uttaranchal | 1 586 321 | 157 180 | 20 | 9.9 | 18 |
| Arunachal Pradesh | 212 615 | 19 539 | 29 | 9.2 | 19 |
| Andhra Pradesh | 16 849 857 | 1 445 424 | 3 | 8.6 | 20 |
| Rajasthan | 9 342 294 | 749 364 | 11 | 8.0 | 21 |
| Dadra and Nagar Haveli | 43 973 | 3 193 | 35 | 7.3 | 22 |
| Jammu and Kashmir | 1 551 768 | 105 234 | 21 | 6.8 | 23 |
| West Bengal | 15 715 915 | 1 052 629 | 8 | 6.7 | 24 |
| Madhya Pradesh | 10 919 653 | 674 855 | 12 | 6.2 | 25 |
| Meghalaya | 420 246 | 25 100 | 26 | 6.0 | 26 |
| Uttar Pradesh | 25 760 601 | 1 444 166 | 4 | 5.6 | 27 |
| Manipur | 397 656 | 21 128 | 28 | 5.3 | 28 |
| Nagaland | 332 050 | 17 402 | 30 | 5.2 | 29 |
| Tripura | 662 023 | 34 693 | 25 | 5.2 | 30 |
| Assam | 4 935 358 | 214 203 | 16 | 4.3 | 31 |
| Orissa | 7 870 127 | 310 846 | 15 | 3.9 | 32 |
| Chhattisgarh | 4 148 518 | 157 330 | 19 | 3.8 | 33 |
| Jharkhand | 4 862 590 | 162 815 | 18 | 3.3 | 34 |
| Bihar | 13 982 590 | 312 350 | 14 | 2.2 | 35 |

**Source** Census of India (2001)

It can be seen that only 9.1% of households in India have a telephone. Further, while 23% of urban households have a telephone, only 3.8% of rural households have a telephone (Census of India 2001). A comparative figure for 1993/94 or for the Census of India 1991 is not available. Hence, it is not possible to comment on the extent of improvement in the penetration of telephones at the household level. However, the collection of such information in future could make for useful analysis. In addition to the total number of households, information on the number of households in rural and uneconomic urban areas would provide for in-depth assessment of the availability of services.

In addition to the number of households having telephones, PCOs and VPTs reflect the status of the availability of services. The number of PCOs and VPTs provides information on the means of access to telecom facilities. Thus, any growth in the deployment of PCOs and VPTs is a reflection of the increase in the availability of telecommunication services. Figure 3 shows the growth of PCOs and VPTs in the country.

It can be seen that while the CAGR for PCOs from 1995 to 1999 and from 1999 to 2002 has been almost the same, it is not the same in the case of VPTs. While the CAGR for VPTs during 1995–99 was about 18%, it was 10.25% during

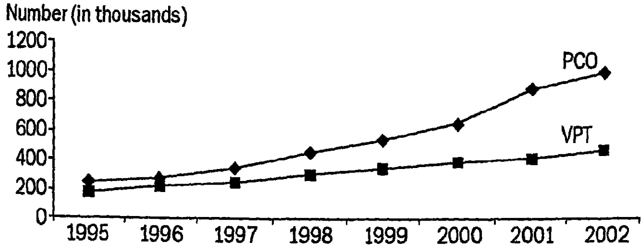

**Figure 3** Growth of PCOs (public call offices) and VPTs (village public telephones) since 1995

1999–2002. Thus, it can be seen that the provisioning of VPTs has slowed down considerably after 1999.

It is common knowledge that the incumbent has traditionally fulfilled the objective of serving rural areas. It can be inferred that as competition in different segments began to gather momentum, commercial concerns have increased for the incumbent. As a result, it has been unable to keep pace with the provisioning of VPTs, which involve relatively higher costs and yield lower revenues. Following NTP 99, the market for basic services was opened to unrestricted competition. The task of providing each village with one public telephone was the responsibility of both the BSNL (Bharat Sanchar Nigam Ltd) and the licensed private operators.

As per the terms of the license agreement, private operators had to provide a minimum of 10% DELs (direct exchange lines) as VPTs (MoFCA 2001). In fact, private operators were supposed to provide 97 806 VPTs during the first three years (MoFCA 2002). However, these targets were not met. Table 3 gives the number of VPTs to be provided by all operators and Table 4 shows the achievement of these operators.

By December 2001, 0.43 million villages, out of 0.67 million villages, had VPTs. The total number of VPTs provided by private operators at this point of time was 718 (DoT 2002). By the end of December 2002, the total number of villages covered by VPTs had increased to 0.51 million (DoT 2003). Of this, the private sector had provided 7123 VPTs. It can thus be seen that the regulatory framework has failed to deliver in respect of VPT obligations.

One of the specific time-bound targets laid down by NTP 99 with regard to universal service[2] was to achieve

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[2] NTP 94 specified 'what is meant by the expression universal service is the provision of access to all people for certain basic telecom services at affordable and reasonable prices'.

**Table 3** Village public telephony roll-out plan — annual targets (as on 31 March 2001)

| Service provider | *Prior to 1998* | *1998/99* | *1999/2000* | *2000/01* | *2001/02* |
|---|---|---|---|---|---|
| DoT (now BSNL) | — | 45 000 | 45 136 | 85 509 | 143 255 |
| Private | — | 16 755 | 23 119 | 27 912 | 55 182 |
| Total | — | 61 755 | 68 255 | 113 421 | 198 437 |

**Source** TRAI (2001)

**Table 4** Village public telephony roll-out plan — achievements (as on 31 March 2001)

| Service provider | *Prior to 1998* | *1998/99* | *1999/2000* | *2000/01* |
|---|---|---|---|---|
| DoT (now BSNL) | 303 582 | 37 058 | 33 965 | 33 848 |
| Private | — | Nil | 12 | 457 |
| Total | — | 37 058 | 33 977 | 34 305 |
| Cumulative total | 303 582 | 340 640 | 374 617 | 408 922 |

**Source** TRAI (2001)

telecom coverage of all villages in the country by the year 2002. As is evident from the above figures, this target remains unachieved. Providing universal service and monitoring this obligation is an important role of the regulatory framework. The regulator is required to ensure effective compliance of universal service obligations. However, failure to ensure compliance with the universal service obligations has been a failure of this framework.

Moreover, rural connectivity still remains a matter of concern. Even in villages where telephones have been provided, the general experience has been that many VPTs do not function properly and the efficiency of existing systems at many places is not very satisfactory.

In order to enhance the teledensity in rural and remote areas, a USF (universal service fund) was set up in 2002/03. To meet the investment required for this purpose, as also to compensate the service providers operating in the non-viable areas, a five per cent universal levy has been imposed on the adjusted gross revenue on all telecom operators, excluding the purely value-added service providers. An administrator for the implementation of USF has also been appointed.

The USF has disbursed 3000 million rupees for 2002/03, out of which 600 million rupees went towards the replacement of non-functional MARR VPTs. The rest of the amount was disbursed as operational expenses for existing VPTs. The government is preparing for the second phase of disbursement to fund the capital and operational expenditure of service providers for replacing VPTs based on MARR. The budget this year has allocated 1000 million rupees for the second phase.[3]

The telecom network in the rural areas has expanded at a fast pace post-1999. Figure 4 shows the status of rural DELs (direct exchange lines) from 1995 onwards. The CAGR for rural DELs after 1999 is more than 31%. This is significantly higher than the CAGR of 23% for the same, prior to 1999.

Increased availability of telecommunications services has been provided not only by way of basic services but also by way of cellular services. Though it cannot be denied that cellular service is a mode of personal and not group or family communication, yet, it is rapidly gaining popularity. In fact, in a few places mobile penetration is far greater than that of fixed phones.[4]

Cellular licenses were awarded to the private sector first in the metropolitan cities of Delhi, Mumbai, Kolkata, and Chennai in 1994, and then in the 19 telecom circles in 1995.

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[3] Shyamal Ghosh, 29 April 2003, Seminar on 'Universal Service Obligations in India'

[4] Mobile penetration as percentage of fixed phones in some towns in Kerala is as follows—Kotakkal: 141%, Manjeri: 117%, Malappuram: 103%, and Koudotti: 99%

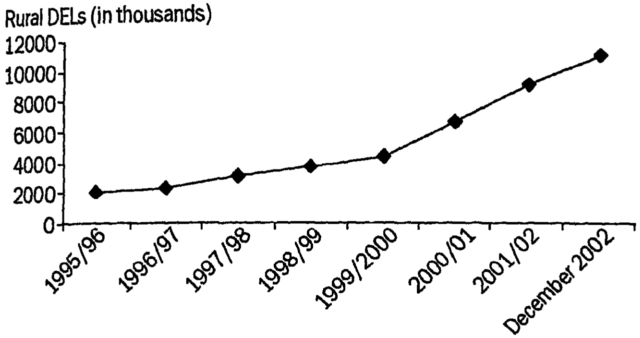

**Figure 4** Status of rural DELs (direct exchange lines) since 1995

By September 2002, this service was available in over 1500 cities and towns.[5] Subscribers have grown at a CAGR of 83% since 1997. Figure 5 illustrates the growth in subscriber base of these services for the country as a whole as well as for the different circles.[6] The growth in subscriber base has not been uniform across the different circles. The number of cities and towns covered by cellular services since December 1998 is shown in Figure 6.

Overall, it can be said that regulatory reforms have increased the spread of telecommunication services. This can be seen from the increased teledensity and the declining urban to rural teledensity ratio. Rural teledensity has also increased manifold and the targets of NTP 99 will be well achieved in the rural areas. The increasing spread of telecommunication services has encouraged the government to revise the target of teledensity—from the projected 7.5%

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[5] Cellular Operators Association of India, February 2003. Presentation to Dr Arun Shourie, the Hon'ble Minister of Communications, IT & Disinvestment, New Delhi.

[6] In cellular services, there are 22 service areas or 'circles'. Eighteen circles correspond with the state boundaries. The four metros form separate circles.

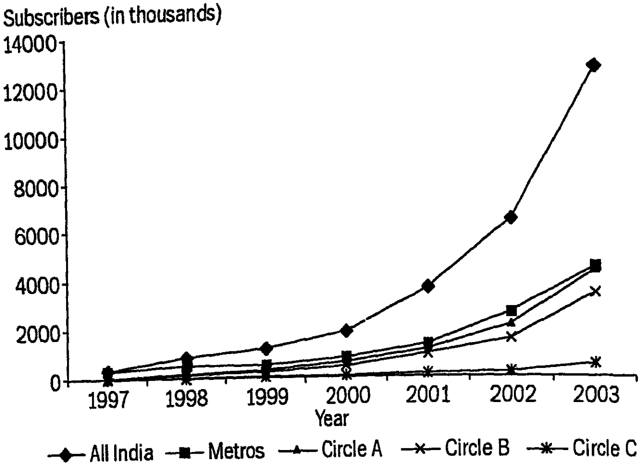

**Figure 5** Status of cellular subscribers: 1997–2003
**Source** COAI (2003)

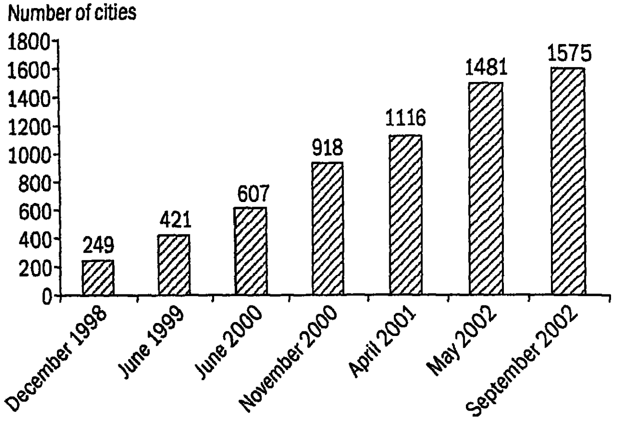

**Figure 6** Number of cities and towns covered by cellular services
**Source** COAI (2003)

to 10% in 2005 and from 15% to 50% in 2010 (Rastogi 2003). However, the regulatory framework has failed to deliver in respect of universal service obligations. Provisioning of VPTs has slowed down after 1999 and the regulatory framework has failed to ensure compliance with these obligations. The target laid down by NTP 99 of achieving telecom coverage of all villages in the country by 2002 has also not been fulfilled.

### Tariff rebalancing

The issue of tariff rebalancing has been discussed in detail later in this publication.

### Quality of service

One of the key objectives of regulatory reforms is to improve the QoS for the consumers. The TRAI Act (1997), as amended in 2000, empowers TRAI to lay down the standards of QoS to be provided by the service providers. It has to ensure the provision of the stipulated QoS and conduct periodical surveys of such service provided by the service providers. This would serve to protect the interests of the consumers of telecommunication services.

In keeping with its powers, TRAI notified a 'Regulation on Quality of Service of Basic and Cellular Mobile Telephone Services' in July 2000.[7] This regulation laid down the QoS parameters applicable to the Basic and Cellular Mobile Service Provider's Network. It also provided for the measurement of QoS provided by different service providers and their comparison with the mandated norms, so as to assess the level of performance. A set of parameters prescribed by TRAI for basic and cellular services is shown in Annexe I.

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[7] The TRAI has also specified benchmarks to cover QoS for dial-up and leased line access services. It has also specified the end-to-end QoS parameters to be met by the ILD operators, as well as in the ILD segment of the network. These have been mandated in the Regulation on Quality of Service of Dial-up and Leased Line Internet Access Service, 2001; and Regulation on Quality of Service for VOIP Based International Long Distance Service, 2002, respectively.

In order to objectively measure the QoS as well as subjectively assess customer perceptions regarding telecom services, TRAI commissioned a study by an independent agency in December 2001. Two quarterly reports of this survey were published by TRAI in August 2002 and March 2003, respectively. Since no consumer surveys are available for the period prior to this, it is difficult to comment on customer satisfaction as regards QoS.

The findings of surveys are given below.

- Both basic and cellular operators were not meeting all the QoS norms laid down by TRAI.
- In the case of basic services, operators still need to focus on areas of service provision, maintainability, network performance, and help services.
- In the case of cellular services, service providers were not meeting the mandated norms relating to network performance, reliability and availability, maintainability, and billing parameters. Network performance, reliability, and availability (dissatisfaction with coverage) are the key areas that need improvement.
- In most circles where competition was present, the incumbent provided marginally better satisfaction to customers. However, in Chhattisgarh, Madhya Pradesh, and Punjab, private operators were slightly better.

The findings of the surveys have been analysed below with the objective of understanding the impact of competition on the QoS provided by operators. It is important to note here that competition may not be the only driving force behind QoS. Several factors like technology, better managerial and technical manpower, and efficient use of spectrum may also affect the QoS. However, such a causal analysis would be far more extensive and would require topical attention. Here, we attempt to examine the impact of competition on the QoS delivered by service providers.

From October 2001 till June 2002, the performance of 30 basic service operators[8] was surveyed. The survey reveals that more service providers were meeting the QoS standards laid down by the regulator in circles where competition was present (Table 5). As documented in the survey, competition was present in six circles. Each circle had the incumbent and the new licensee as the service providers. Hence, there were a total of 12 operators in circles with competition. Eighteen circles had only the incumbent as the service provider, implying a total of 18 operators in circles without competition.

Table 5 shows that in the case of seven parameters, more operators are meeting QoS norms in circles with competition. With regard to three parameters, more operators are meeting norms in circles without competition. On one parameter, the performance of operators in circles with and without competition is the same. This, in turn, can be inferred to imply that the performance of operators is better in circles where competition is present.

The customer scores on satisfaction with services by basic operators also support the correlation between competition and better performance. Table 6 shows that on five out of seven parameters, more operators met the norms for customer perception of services in circles with competition. Only in the case of 'satisfaction with overall service', more operators in circles without competition are meeting the norms specified by the regulator. On one parameter, the performance of operators in circles with and without competition is the same.

Though the performance of operators is better in circles with competition in respect of objective parameters as well as 'customer scores on satisfaction with services', there is little difference in the performance in circles with

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[8] The incumbent's operations in different circles have been treated as a separate service provider.

**Table 5** Percentage of operators meeting QoS (quality of service) norms for basic services (October 2001–June 2002)

| QoS Parameter | *Operators meeting QoS norms in circles with competition* (%)* | *Operators meeting QoS norms in circles without competition* (%)* |
|---|---|---|
| New connections given in 15 days and less after registration of demand (%) | 0 | 0 |
| Fault incidences per 100 subscribers month | 18.18 | 0 |
| Fault repair by next working day | 33.33 | 5.56 |
| Mean time to repair | 0 | 11.11 |
| Call completion rate in local network | 18.18 | 5.88 |
| Metering and billing credibility | 41.67 | 38.89 |
| Response to operator assisted services | 12.50 | 20.00 |
| Customer care promptness in attending to 95% of requests for shifting | 9.09 | 0.00 |
| Customer care promptness in attending to 95% of requests for closures | 18.18 | 16.67 |
| Customer care promptness in attending to 95% of requests for additional facility | 36.36 | 23.53 |
| Percentage of repeated faults | 16.67 | 22.22 |

* The number of operators meeting QoS norms has been divided by the total number of operators in these circles. In cases where data are not available for operators, the total number of operators, i.e. the denominator, has been decreased by the number for which data are not available.

**Source** TRAI, Survey conducted by TRAI to assess QoS provided by BSOs/CMSOs – Summarized results: October 2001–June 2002. The data have been compiled on the basis of Annexes XV and XVI.

competition and circles without competition. Thus, while some link can be seen between competition and QoS, the results are not conclusive because of low presence of competition in this segment.

On the other hand, the survey results for cellular operators show that competition does not necessarily drive

**Table 6** Percentage of operators meeting QoS (quality of service) norms for 'customer perception of services' for basic services (October 2001–June 2002

| Customer scores on satisfaction with | *Operators meeting norms in circles with competition (%)* | *Operators meeting norms in circles without competition (%)* |
|---|---|---|
| Service provision | 16.67 | 0 |
| Network performance, reliability, and availability | 8.33 | 0 |
| Maintainability | 0 | 0 |
| Help services | 41.67 | 27.78 |
| Billing | 58.33 | 33.33 |
| Supplementary services | 66.67 | 55.56 |
| Overall service | 25.00 | 27.78 |

**Source** TRAI, Survey conducted by TRAI to assess QoS provided by BSOs/CMSOs – Summarized results: October 2001–June 2002

towards better provision of QoS. Survey results for three different quarters have been compared in Table 7.

It can be seen from Table 7 that in the first survey period, more operators in circles with three operators met the QoS norms. Same is the case in the third survey period. In the second survey period, operators in circles with no competition have performed better. Over the three survey periods, circles with two operators have the largest number of operators not meeting the standards. This leads us to believe that in cellular services, greater competition has not led to better provision of QoS.

An analysis of operators meeting QoS norms with regard to customer scores on satisfaction with cellular services also suggests that increased competition does not necessarily mean greater adherence to QoS norms (Table 8). When compared to operators in circles with three operators, more operators have fulfilled the norms for 'customer perception of services' in circles where only two operators are

**Table 7** Percentage of operators meeting QoS (quality of service) norms for cellular services

| QoS Parameter | *Operators meeting QoS norms in circles with three operators* (%)* | | | *Operators meeting QoS norms in circles with two operators* (%)* | | | *Operators meeting QoS norms in circles with one operator* (%)* | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Oct.– Dec. 2001* | *Jan.– Mar. 02* | *Apr.– June 02* | *Oct.– Dec. 2001* | *Jan.– Mar. 02* | *Apr.– June 02* | *Oct.– Dec. 2001* | *Jan.– Mar. 02* | *Apr.– June 02* |
| Fault incidence (no. of faults/ 100 subscribers/month) | 100.00 | 100.00 | 100.00 | 91.67 | 90.48 | 95.83 | 100.00 | 100.00 | 100.00 |
| Faults cleared within 24 hours | 66.67 | 60.00 | 60.00 | 42.86 | 41.18 | 39.13 | 57.14 | 71.43 | 57.14 |
| Call success rate (within licensees own network) | 80.00 | 50.00 | 66.67 | 50.00 | 61.90 | 58.33 | 66.67 | 85.71 | 50.00 |
| Call drop rate | 100.00 | 100.00 | 100.00 | 100.00 | 95.65 | 96.15 | 100.00 | 100.00 | 100.00 |
| Percentage of connections with good voice quality | 75.00 | 100.00 | 100.00 | 70.83 | 90.48 | 95.24 | 100.00 | 100.00 | 100.00 |
| Billing complaints per 100 bills issued | 66.67 | 50.00 | 50.00 | 50.00 | 31.82 | 26.92 | 57.14 | 85.71 | 71.43 |
| Percentage of billing complaints resolved within 4 weeks | 66.67 | 80.00 | 83.33 | 69.57 | 72.73 | 73.08 | 85.71 | 100.00 | 100.00 |

* The number of operators meeting QoS norms has been divided by the total number of operators in these circles. In cases where data are not available for operators, the total number of operators, i.e. the denominator, has been decreased by the number for which data are not available.

**Source** TRAI, Survey conducted by TRAI to assess QoS provided by BSOs/CMSOs – Summarized results: October 2001–June 2002.

**Table 8** Percentage of operators meeting QoS (quality of service) norms for 'customer perception of services' for cellular services (October 2001–June 2002)

| Parameters | *Operators meeting QoS norms in circles with three operators* (%) | *Operators meeting QoS norms in circles with two operators* (%) | *Operators meeting QoS norms in circles with one operator* (%) |
|---|---|---|---|
| Service provision | 33.33 | 84.62 | 71.43 |
| Network performance, reliability, and availability | 0 | 0 | 0 |
| Maintainability | 0 | 0 | 0 |
| Help services | 66.67 | 69.23 | 28.57 |
| Billing | 16.67 | 57.69 | 0 |
| Overall service | 83.33 | 30.77 | 0 |

competing. Though the performance of operators in circles with a single service provider is dismal; in respect of service provision, more operators in these circles adhered to the norms for 'customer satisfaction with service provision' as compared to circles where competition involved three operators.

The findings of the survey, both objective and subjective, show that increased competition does not imply better QoS or adherence to QoS norms by service providers. Moreover, competition in this segment has been based more on tariffs and not QoS.

During our discussions with stakeholders, many highlighted that norms on QoS are not the outcome of regulatory reforms. QoS parameters, as mandated by the International Telecommunications Union and the Asia-Pacific Telecommunity, are known to the government as well as the licensees at the time of signing the license. In fact, QoS was also monitored by the BSNL (Bharat Sanchar Nigam Ltd) before regulations on the service quality were. laid down by the regulator.

During March 1999–March 2000, the BSNL carried out technical inspections of 10 telephone systems. Similar inspections were carried out during the period March 2000–March 2001. Factors that adversely affected the performance of telephone systems were analysed and brought to the notice of the concerned field units. A similar inspection had also been carried out in 1998/99. During March 1999–March 2001, an independent agency had conducted a study twice on 'Quality of Telephone Service appraisal' at 75 stations (DoT 2003).

The performance parameters of BSNL, as monitored by it, are shown in Table 9. The table shows that though, till 1997/98, there has been a fluctuating trend in performance with regard to faults, the number of faults has decreased over the years. Moreover, the CAGR for reduction in faults per 100 stations per month has increased after 1997/98. Similarly, trunk efficiency has improved over the years; it has improved rapidly after 1997/98 as compared to the period before that. This improvement in the performance of incumbents cannot be attributed to a single factor. Several factors, including a gradual increase in competitive activity, may have brought about an improvement in QoS.

In sum, though the regulator has issued regulations pertaining to QoS, the regulatory framework has not been effective in ensuring provision of the desired QoS. This is also supported by the results of the survey conducted by the regulator. No penalties have been levied on service providers not meeting the QoS standards[9] and no disciplinary action

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[9] However, some rebate is given by operators to the subscriber in case services are interrupted. For example, the BSNL provides a rebate in rental *suo-moto* to subscribers when the services are interrupted over a prolonged period due to departmental reasons. Proportionate rental rebate is given when the service is interrupted for a period ranging from 7 to 14 days. Thirty days' rental rebate will be given to subscribers when the service is interrupted for more than 15 days but less than 30 days.

**Table 9** Performance of BSNL (Bharat Sanchar Nigam Ltd): 1991/92 to November 2002

| *Activity* | *1991/92* | *1992/93* | *1993/94* | *1994/95* | *1995/96* | *1996/97* | *1997/98* | *1998/99* | *1999/2000* | *2000/01* | *2001/02* | *Nov. 2002* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Faults/100 stations/ month | 19.00 | 18.20 | 18.30 | 17.60 | 15.80 | 17.20 | 17.40 | 16.90 | 15.50 | 12.79 | 11.64 | 10.50 |
| Trunk efficiency (%) | 77.00 | 79.00 | 80.00 | 79.00 | 79.00 | 81.00 | 82.00 | 82.70 | 84.20 | 84.02 | 86.10 | 86.50 |

**Source** DoT (2001, 2002, 2003)

has been taken. Unless this happens, setting standards or surveying adherence to these standards has no value. Alternatively, if these norms are unrealistic, they should be revised. It may also be better to reduce the number of parameters monitored. A few key parameters could be identified and linked with penalties. The lack of penalties for poor performance has considerably weakened the effectiveness of the regulatory framework in respect of QoS. Such regulatory intervention would be required unless there is more conclusive evidence on the impact of competition on QoS.

Some more areas of concern remain with regard to QoS. Regulatory reforms have achieved little with respect to grievance mechanisms for consumers of telecommunication services. Efforts have to be made for a wider dissemination of the results of the survey that has been conducted by the regulator. In particular, consumers should be informed about the level and quality of service being provided by service providers operating in their circles. This will help consumers make a more informed choice when choosing their service provider. This is important because the QoS

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*footnote 9 continued*

Pro-rata rental rebate is given when the service is interrupted for more than one month. In all these rebate cases, there is a corresponding reduction in the number of free calls allowed. Chennai Telephones, a unit of the BSNL, also notes that the shift of a telephone will be carried out within 30 days subject to technical feasibility. If the shift is delayed, due to departmental reasons, the subscriber is entitled for rebate in rental beyond 15 days/30 days as the case may be. In the case of Touchtel, a rebate is given on service failure. If a telephone connection is out of order for more than seven days continuously, proportional rebate in rental/monthly plan fee as applicable is given to the subscriber.
<http://www.bsnl.co.in/faq/faq_2.htm>; <http://chennai.bsnl.co.in/index.html>; <http://www.touchtelindia.com>

available to the users of telecommunication services is as important as the availability of the service itself.

Further, surveys conducted to assess the performance of operators of telecommunication services as against QoS should also aim at assessing the impact of competition on the services provided. While competition is not the only driving force behind QoS, such an exercise would show whether there is a trade off between QoS and tariff-based competition.

## Facilitating competition

One of the objectives of NTP 99 is to 'transform in a time-bound manner, the telecommunications sector to a greater competitive environment in both urban and rural areas providing equal opportunities and level playing field for all players'. While the government is responsible for the introduction of competition in the different segments, the regulator has an important role in providing 'measures for facilitating competition so as to facilitate growth of various services'. This has assumed significant importance in the competitive landscape that has slowly been introduced in the Indian telecom sector. Regulatory reforms have to ensure a level playing field for this competition to flourish and yield benefits to consumers. In view of the above, it is important to assess the impact of regulatory reforms on the facilitation of competition.

### *Interconnection*

The practical manifestation of facilitation of competition as also of a level playing field is in ensuring equitable and non-discriminatory interconnection between service providers. To this end, TRAI has been given the powers to fix the terms and conditions of interconnectivity between various service providers. In addition, it has to ensure technical compatibility and effective interconnection between different service providers. License agreements also mandate operators to connect with other operators.

For example, the license for NLD (national long distance) mandates fixed service providers, cellular operators, and cable service providers to provide interconnection to NLDOs (national long-distance operators) whereby subscribers could have a free choice to make inter-circle/international long-distance calls through the NLDO. Similarly, for inter-circle and international long distance, basic service operators are obligated to interconnect with NLD service providers through suitable arrangements/agreements whereby the subscribers could have a free choice to make inter-circle/international long-distance calls through NLD service providers.

Till December 2002, changes to the interconnection charges were based on revenue sharing specified in the licenses.[10] The approach for ensuring interconnection has been that of mutual negotiations on interconnection agreements. Regulatory intervention has been mainly for

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[10] In the first interconnection regulation of May 1999, while interconnection charges were specified in terms of set-up costs, revenue-sharing arrangements were specified in terms of usage charges. The revenue-sharing arrangement for basic services, as specified in this order, was based on the interconnection terms specified in the license for basic services. For local calls, it mandated a bill-and-keep arrangement. The originating service provider would pay 40% of per unit of measured call and 55% of per unit of measured call for domestic long-distance and international calls, respectively.

Revenue-sharing arrangements between the fixed and mobile operators were specified in the Telecommunications Interconnection (Charges and Revenue Sharing – First Amendment) Regulation 1999. This regulation laid down the payment of a mobile termination charge to the mobile operator of the order of 1.60 rupees for the first minute and 0.80 paise for each successive minute. This arrangement was, however, to be temporary and would be replaced by cost-based access/usage charges.

### **Box 2** Reference Interconnect Offer

In July 2002, TRAI (Telecom Regulatory Authority of India) notified the RIO (Reference Interconnect Offer) Guidelines in July 2002 to be followed by the telecom operators in the country. The model RIO consists of articles and schedules and is accompanied by guidelines. It is generic in nature and brings forth the various principles and elements involved in proper and effective interconnection. The RIO specifies that a service provider with a share of 30% of total activity in a licensed telecommunication service area would be considered as having significant market power. Such a service provider has been mandated to publish an RIO stipulating the various technical and commercial conditions including a basis for interconnect usage charges for origination transit, and termination. This service provider has been mandated to publish an RIO within 90 days of issue of this regulation. Any changes in a published RIO can be done only with the prior approval of the regulator. Interconnection agreements are required to be entered into by and between all service providers based on the RIOs so published. However, the interconnection provider and the seeker may modify and/or add to the terms and conditions stipulated in the published RIO by mutual agreement and enter into an individualized agreement.

dispute resolution. Over a period of time, there has been a move to a system of cost-based charges for the usage of network elements, i.e. a move to a system of cost-based origination, termination, and transit charges. Operators with 'significant market power' are now required to publish an RIO (Reference Interconnect Offer) (Box 2). The IUC (interconnection usage charge) regime was laid down by the regulator in January 2003. However, a review of this regime is currently being undertaken.

Later, in January 2001, TRAI determined that cellular operators could retain five per cent of the revenue paid by them to basic service operators. While this may be termed as revenue share, this retention of revenue was on account of the fact that cellular operators incur billing and collection costs, and bad debts on the amount of revenues they collect from subscribers and pass on to basic service operators for carriage of calls on their networks.

The approach to interconnection as adopted by the regulatory framework has not been successful. Timely intervention by the regulator has also not been forthcoming and there have been long drawn-out negotiations and disputes. While this can also be attributed to the reluctance of the incumbent, i.e. the dominant operator to quickly reach a mutually agreed interconnection arrangement, it cannot be ignored that the regulatory framework has been unsuccessful in ensuring timely and equitable interconnection. Moreover, a lack of certainty and predictability has been induced with the regulator undertaking a review of some of its own orders. Our discussion with the stakeholders in the sector has also brought to light general dissatisfaction with the interconnection framework as well as the approach to dispute settlement over the years.

Though the approach to interconnection and the charges laid down by the regulatory framework from time to time have been contested by various operators on the grounds that they are ridden with several anomalies and lacunae, it cannot be overlooked that given their individual business interests, all regulated entities would never accept the amount to be paid as interconnection charges to another segment of operators. Some discontent would always prevail among a few service providers.

### *Equal access to operators*

The essence of competition lies in providing the consumer with equal access to all operators. The success of the policy of opening the long-distance markets to competition depends, in part, on the regulatory measures instituted to counterbalance the power of the incumbent telecommunications operator. Moreover, in a competitive scenario, it is only fair that customers be allowed to select a long-distance carrier for routing their long-distance calls. The mechanism that permits customers to choose national and/or international long-distance telecommunication carriers is called carrier selection.[11] The manner in which carrier selection is introduced into public telephone networks has a significant impact on the speed with which new entrants can obtain a viable share in different market segments.

In July 2002, the regulator issued a directive to the operators concerned to carry out the required system modifications within a stipulated time frame and provide customers with call-by-call carrier selection as well as carrier pre-selection. It requires cellular and basic operators to implement carrier pre-selection for national long-distance calls within 6 and 9 months, respectively, and for international long-distance calls within 6 and 18 months, respectively, from the date of request from the long-distance operators to access providers. Taking into account the implementation issues, the regulator specified a phased approach to carrier pre-selection. The entire process is to be completed by December 2003.

### Accounting separation

TRAI has finalized the system of accounting separation, providing a detailed accounting and financial system to be maintained by service providers. It has forwarded the same to the DoT for notification under Section 35(2)d of the TRAI Act. Principles of accounting separation would aid the monitoring and measurement of financial performance of individual products/network services. In addition, it would help disaggregate costs to the level of network elements. This, in turn, would aid in better regulation of various aspects related to competition.

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[11] Carrier selection can be of two types. In the case of call-by-call carrier selection, a carrier access code is required to be dialled for the routing of each call. In the case of carrier pre-selection, the subscriber indicates his choice of carrier in advance for automatic routing of calls, without having to dial the carrier access code each time.

It would help in the identification of any existing cross-subsidization practices in the industry. Provisions for the maintenance of detailed cost records to the level of network elements would enable the generation of accurate information on costs. This would serve as an important input in the regulation of tariffs and interconnection, and would play an important role in the promotion of healthy competition. Moreover, it would serve to detect unfair competitive practices.

The benefits of accounting separation are not limited to the regulator. It would also enable operators to establish a better and more comprehensive system for arriving at costs and revenues for different products/network services, which would serve to enhance their operating efficiency.

### *Other tools*

Several other tools like tariff regulation can also be used effectively in providing a level playing field to competing operators. This tool has been used successfully in creating a framework, when the situation so demanded, for providing a level playing field to various operators (Box 3).

## Growth of new entrants

As mentioned earlier, private sector participation has been introduced in the Indian telecom sector at different stages and in phases. It is an acknowledged fact that the new entrants face difficulties in establishing themselves and gaining ground in view of the presence of the dominant and large incumbent. As mentioned in the discussion on interconnection, obtaining access to the network of the incumbent, i.e. the monopoly element is crucial for the growth and survival of the private sector. Thus, the regulatory framework has an important role to play in this context.

### **Box 3** TRAI, retail tariffs, and level playing field

In January 2001, the BSNL sought to reduce the domestic long-distance charges by extending the duration of peak pulse rates for distance categories 50 to 200 km applicable only to 'intra-circle calls originated by the telephone subscribers of the BSNL, and terminating in the basic service network'. The following table shows the old pulse rates and the proposed pulse rates.

| Kilometres | *Existing pulse* | *Proposed pulse* |
|---|---|---|
| 50–100 | 15 | 120 |
| 100–200 | 15 | 30 |

The association of cellular operators and of basic operators sought TRAI's intervention to enlarge the scope of the BSNL's proposal in respect of inter-network calls also. They requested that the revised pulse rates (or tariffs) should also apply to calls from fixed network to cellular network. The revised pulse rates should also apply for calculating the carriage charge to be paid by cellular mobile network to the fixed network; and for the carriage charge paid by private basic service providers to the BSNL on intra-circle fixed to fixed network calls. This would also provide for a level playing field.

In order to ensure 'non-discrimination' and a 'level playing field', TRAI decided that BSNL's revised pulse rates would also apply to the inter-network calls as detailed by the cellular and other basic operators. Moreover, to ensure that the benefit of the lower tariff offered by the BSNL was actually passed on to the subscribers of the private basic service operators, it asked the BSNL to modify the charging regime in respect of inter-network calls originating on the BSNL network to fully reflect the tariff changes effected by the BSNL. This would facilitate the payment of carriage charges and sharing of revenue based on the new charging regime. TRAI also decided that 'for STD long-distance calls, the pulse applicable to all inter-network calls in alternative tariff packages should be the same and should be the pulse rate providing the lowest tariff for such calls'.

In view of this, the growth of new entrants is an indicator for measuring the success of regulatory reforms. Figure 7 shows the share of the new entrants, i.e. the private sector in the total number of telephones.

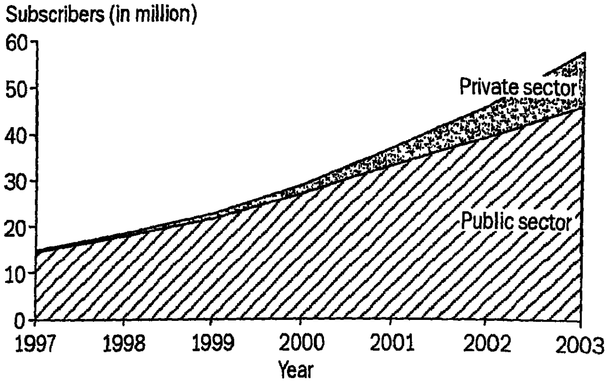

**Figure 7** Share of private sector in total telephones (fixed and cellular), 1997–2003
**Source** Data compiled by TERI

It can be seen that the share of the private sector in the total number of telephones has increased from 2.28% in March 1997 to 20.46% at the end of February 2003. This growth can be attributed to a number of reasons. Moreover, it can be argued that cellular services were initially opened up only to the private sector. However, the regulatory regime has contributed to the expansion of the private sector by providing the new entrants with the framework in which they can compete.

### *Investment*

That attraction of investment in the telecom sector is important can be seen in NTP 99. The emphasis on creating an environment that 'enables continued attraction of investment in the sector' has been stressed in this policy. The Investment Policy Cell in the DoT is responsible for providing assistance in the formulation of foreign investment policies and procedures for the telecom sector. It also prepares the policy and guidelines on FDI (foreign direct investment) in the telecom sector, and maintains a database on FDI in various sectors. The formulation of

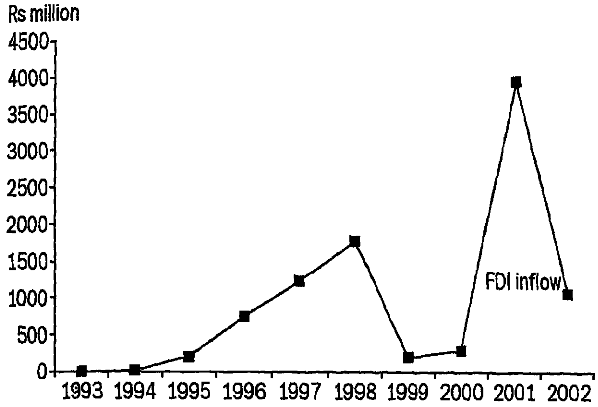

**Figure 8** Actual inflow of foreign direct investment in the telecom sector: 1993–2002
**Source** Investindiatelecom <http://www.investindiatelecom.com/Investment%20Policy/FDI%20inflow-year-wise.htm>

policies for stimulating private investment in the telecom sector is also an important role of this cell.

FDI up to 100% has been allowed in the telecom manufacturing sector and services like e-mail, voice-mail, Internet (without gateways), and infrastructure providers (IP-I). An FDI of 74% is allowed in the case of radio paging service, Internet (with gateways), and end-to-end bandwidth providers (IP-II). In the case of basic, cellular, national/international long-distance service and value-added services, FDI is limited to 49%.

The amount of investment flowing into the sector depends on a number of factors and regulatory certainty is one of the key factors in determining investment. Figure 8 shows the inflow of FDI into the telecom sector prior to regulatory reforms and after that. The inflow for each year relates to the calendar year, i.e. January–December.

An assessment of the investment flow in the sector shows that there has been considerable fluctuation in the flow of FDI. More importantly, policy and regulatory gaps coincide with these fluctuations. The inflow of FDI declined drastically during 1999 and then increased marginally in 2000. Then it increased manifold in 2001. It is important to remember here that the problems of the private sector operators had compounded by 1999; they were not able to pay the license fees they had committed to and losses were mounting. At the same time, the regulator was disbanded and the cabinet approved a plan to *reinvent the regulator*. It can be inferred that the low inflow of FDI in 1999 can be attributed to the problems of existing service providers as well as regulatory uncertainty.

NTP 99 was announced in March 1999 and it made several adjustments to the regulatory and licensing framework. September 1999 marked the migration to the revenue-sharing arrangement and the new TRAI came into being in January 2000. The low FDI in 2000 can be assumed to be representative of the gestation lag between the announcement of the policy and investment by various investors. In addition, it can also be assumed that given the experience prior to 2000, investors adopted a cautious approach and allowed the new regulatory regime to stabilize and develop before rushing with decisions related to investment.

On the whole, the regulatory framework has instituted some important tools for facilitating competition. However, the real issue in the case of competition is that of interconnection. The regulatory framework has not helped to hasten the process of timely and equitable interconnection. In the multi-operator environment that now prevails, the regulatory framework has neither provided for greater certainty to the inter-operator settlements nor facilitated interconnection agreements. It has not been able to manage interconnection in a manner that provides credible assurances regarding a level playing field.

Further, a stable regime for facilitating competition has not yet been achieved. This may impact the inflow of investment. However, the regulatory framework has provided new entrants with the framework in which they can compete. This can be seen from the growth of the private sector and its increasing share in the overall market for telecom services.

## Promoting efficiency

As per the TRAI Act, the regulator is mandated to recommend to the government 'measures to facilitate competition and promote efficiency in the operations of the telecommunication services so as to facilitate growth in such services'. Thus, the role of the regulator with regard to promotion of efficiency is only recommendatory. Nevertheless, the regulated entities have themselves made an attempt to promote efficiency in their operations.

This is particularly true of the incumbent. The private sector being relatively new, little can be said in respect of the increased efficiency in its case. In the case of the incumbent, efficiency can be noted by way of several factors. These include the number of employees per DEL, trunk efficiency, fault rates, etc. Trends in respect of trunk efficiency and fault rates have been discussed in the section on QoS and it has been seen that the efficiency of the incumbent has increased after 1997/98.

It can be seen from Figure 9 that the staff per 1000 DELs has declined significantly. The CAGR for this decline has been greater from 1998 to 2003 as compared to the period before that. Once again, enhanced efficiency cannot be contributed to any single factor. Several factors like competitive pressures, advanced technology and managerial efficiency can account for the increase in efficiency.

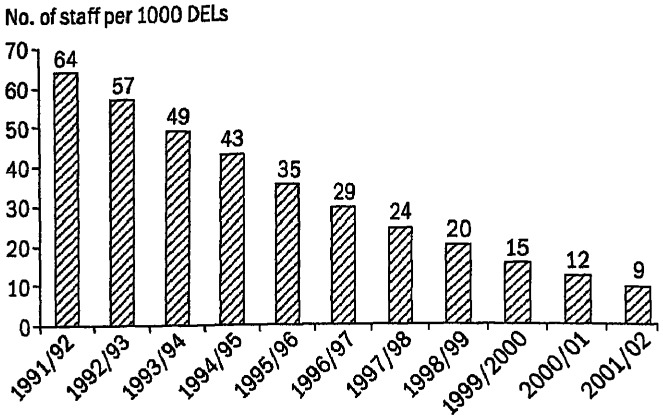

**Figure 9** Staff per 1000 DELs (direct exchange lines) for the BSNL
**Source** DoT (2001, 2002, 2003)

# Impact of regulatory reforms in the telecom sector

The focus of NTP 94 (National Telecom Policy 1994) was on 'telecommunication for all and telecommunication within the reach of all'. This meant ensuring the availability of telephone on demand as early as possible. Another basic objective of the policy was to achieve universal service covering all villages as early as possible. Provision of the 'widest permissible range of services' at 'reasonable prices' was also stated explicitly. Thus, it can be seen that the availability of telecommunication services at reasonable prices was at the very basis of the government's policy. Availability of affordable and effective communications for the citizens remains at the core of the vision and goal of NTP 99 (New Telecom Policy 1999) as well and has been explicitly stated in the objectives of the policy.

Thus, at the heart of NTP 99 and the regulatory changes that accompanied it was the objective of increasing the availability of telecom services and making them affordable. Availability of services has already been discussed earlier. This chapter attempts to assess the impact of regulatory reforms by measuring the impact of tariff regulation.

In the context of availability of services, it is imperative that a balanced growth of telecommunication services across the country be undertaken. Regulatory reforms should benefit all segments of the society alike. Thus, it is important to know who the beneficiaries of reforms are, i.e. whether reforms have benefited only the richer segments or have also made a significant impact on the poorer segments.

The extent to which the benefits of these reforms have penetrated underserved and economically-backward areas needs to be assessed. This chapter also, therefore, assesses the impact of reforms with the objective of determining the beneficiaries.

Traditionally, affordability of telecom services, beneficiaries of reforms, and impact on the service is talked of in the context of basic services. Hence, examining tariff rebalancing of fixed services is a natural exercise, and in addition to this, the exercise of analysing tariff regulation also involves cellular services. There are several reasons for this; first and foremost, the cost per line in the case of cellular services is lower than that in the case of basic wireline services. This makes cellular services a cheaper mode of provisioning of services.

Secondly, it can be seen from the previous chapter that the rate of growth of cellular services is greater than that of basic services. Another important reason stems from the fact that competition has existed in the cellular segment for a decade now. Furthermore, the Government of India has made efforts to introduce competition to the maximum permissible level as per current policy.[1] Currently, there are four service providers in 11 out of 23 circles. In eight circles, currently three operators are providing services while in three circles, there are only two operators. In two circles, only one operator is providing services.

Thus, the exercise to evaluate the impact of regulatory reforms is being undertaken for both fixed and cellular services.

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[1] Only four service providers are permitted in each circle as per the current policy. The first cellular licenses were awarded to the private sector in 1992 with the liberalization of the telecommunication sector. NTP 99 provided for the government-owned MTNL and BSNL to be the third cellular operators, according to their regions of operation. The licenses for the fourth cellular operator were granted in September 2001.

## Tariff regulation

### *Fixed services*

Prior to regulatory reforms, the pricing structure prevailing in basic services was highly skewed. Long-distance and international long-distance tariffs were very high. This implied that a very small portion of the subscriber base accounted for a very large portion of call revenues. It would thus be attractive for the new entrant to focus on the subscribers making long-distance and international calls. As a result, competition would put pressure on the cross-subsidy mechanism because new entrants focus on those subscribers who give high revenues. Thus, an important task that lay ahead of the regulator was to rebalance tariffs.

The first step towards rebalancing of tariffs was TRAI's (Telecom Regulatory Authority of India) first consultation paper relating to concepts and methodologies for telecom pricing. Further, TRAI undertook a study of the telecom pricing structure with a view to proposing a new tariff regime. The second consultation paper on telecom tariff was a result of that study. Following this, TTO 99 (Telecommunications Tariff Order 1999) was an important step taken by TRAI towards the rebalancing of tariffs.

On 9 March 1999, the TTO 99 was notified by the regulator. The tariffs specified therein were to be implemented with effect from 1 April 1999. On the very next date, however, the central government issued a directive purporting to be under Section 25 of the TRAI Act (1997) that the tariff order be held 'in abeyance till the entire issue is considered by the Government' (TRAI 1999). The effectiveness of the regulator was undermined in the wake of these events.

Following the tariff revision announced by TRAI in 1999, the DoT (Department of Telecommunications) opposed the reduction in long-distance and international call charges and argued that this would have an adverse impact on its revenue and profitability. Increases were also specified in the case of tariffs in respect of rural and low-user urban categories. The DoT adopted the tariffs notified by TRAI with some concessions for rural and low-user urban categories. However, this was not a problem as in keeping with the TRAI order, operators had the flexibility to offer better rates (Sinha 2001). Since DoT estimated that the combined effect of decrease in national and international long-distance tariffs would involve significant net reduction in its revenues in the current year, it asked TRAI to rework the tariffs for the next two years, while bearing in mind the negative impact on the revenues of telecom operators.

The process of tariff rebalancing is examined in the ensuing discussion. The latest round on tariff rebalancing took place in January 2003. Service providers were given the flexibility to offer alternative tariff packages as long as they also offered the tariffs mandated by TRAI. These tariffs mandated by TRAI form the 'standard package'. Though the approach and methods for regulation of tariffs have changed over time, the essence of tariff regulation has continued to be rebalancing of tariffs.

Table 1 provides details of the change in tariffs for NLD (national long-distance) services and the percentage reduction in Table 2.

Tariffs for distance greater than 1000 kilometres have declined by 87% since April 1999. Tariffs for distance of 501–1000 kilometres have decline by almost 81% in the same period. However, it can be seen that the most significant declined in tariffs for this service has taken place since January 2002. This coincides with the entry of the first private player into the domestic long-distance market. Within a period of 12–14 months, NLD tariffs have declined by about 78%.

The trends in tariffs for international long-distance tariffs are shown in Table 3, and the percentage reduction in Table 4.

**Table 1** Trends in tariffs for NLD (national long-distance) services

| Domestic long distance radial distance (km) | *Charge per minute prior to 1 May 1999 at 1.25 rupees per pulse* (Rs) | *As per Telecom Tariff Order 99 from 1 April 1999* (Rs) | *As per Telecom Tariff Order 99 from 1 April 2000* (Rs) | *As per Telecom Tariff Order 99 from 1 April 2001* (Rs) | *January 2002* (Rs) | *March 2003* (Rs) |
|---|---|---|---|---|---|---|
| Up to 50 | 2.08 | 1.2 | 1.20 | 1.20 | 1.20 | 1.20 |
| 51–200 | 9.58 | 6.0 | 6.00 | 4.80 | 2.40 | 2.40 |
| 201–500 | 18.75 | 15.6 | 12.00 | 10.80 | 4.80 | 4.80 |
| 501–1000 | 25.00 | 21.6 | 18.00 | 16.80 | 9.00 | 4.80 |
| Above 1000 | 37.50 | 30.0 | 25.20 | 21.60 | 9.00 | 4.80 |

**Source** Compiled by TERI from various sources

**Table 2** Percentage reduction in NLD (national long-distance) tariffs

| Domestic long distance radial distance (km) | *Decrease with Telecom Tariff Order 99 (1999/2000)* (%) | *Decrease in 2000* (%) | *Decrease in 2001* (%) | *Decrease in January 2002* (%) | *Decrease in March 2003* (%) |
|---|---|---|---|---|---|
| Up to 50 | 42.3 | – | – | – | – |
| 51–200 | 37.4 | – | 20.0 | 50.0 | – |
| 201–500 | 16.8 | 23.08 | 10.0 | 55.5 | – |
| 501–1000 | 13.6 | 16.60 | 6.6 | 46.4 | 46.7 |
| Above 1000 | 20.0 | 16.00 | 14.3 | 58.3 | 46.7 |

Table 4 shows that tariffs have declined by 42% in Slab I and about 74% in Slab III after TTO 99. Tariffs in Slab III have seen the maximum decline after this segment was thrown open to competition.

**Table 3** Trends in tariffs for ILD (international long-distance) services

| ILD Category | *Charge per minute prior to 1 May 1999 at Rs 1.25 per pulse* (Rs) | *As per Telecom Tariff Order 99 with effect from 1 May 1999 at Rs 1.20 per pulse* (Rs) | *As per Telecom Tariff Order 99 with effect from 1 April 2001 at Rs 1.20 per pulse* (Rs) | *July 2002* (Rs) |
|---|---|---|---|---|
| Slab I - SAARC and other neighbouring countries | 37.5 | 30.0 | 21.6 | 21.18 |
| Slab II - countries in Africa, Europe, Gulf, Asia, and Oceania | 62.5 | 49.2 | 32.4 | 24.00 |
| Slab III - countries in American continent and other places in the Western Hemisphere | 75.0 | 61.2 | 40.8 | 24.00 |

**Source** Compiled by TERI from various sources

**Table 4** Percentage reduction in ILD (international long distance) tariffs

| ILD Category | *Decrease with Telecom Tariff Order 99 (1999/2000)* (%) | *Decrease in 2001/02* (%) | *Decrease in 2002/03* (%) |
|---|---|---|---|
| Slab I - SAARC and other neighbouring countries | 20.0 | 28.00 | 1.94 |
| Slab II - countries in Africa, Europe, Gulf, Asia, and Oceania | 21.3 | 34.15 | 25.93 |
| Slab III - countries in American Continent and other places in the Western Hemisphere | 18.4 | 33.33 | 41.18 |

It is evident that the drop in tariffs in the long-distance segments has been almost entirely due to competition. Thus, the tariff rebalancing efforts of the regulator have to some extent been pre-empted by the entry of private long-distance operators. However, while attributing the sharp fall in tariffs for long-distance services to competition, it is important to remember that the regulatory framework plays an important role in facilitating competition and sustaining it.

In a market completely dominated by the incumbent, a new entrant's ability to access the incumbent's network and its subscribers would be severely constrained if it were left entirely to the incumbent. Accordingly, a new entrant's ability to compete in the market, particularly in terms of the tariff that can be offered by the incumbent is limited. The regulatory framework plays a key role here by ensuring equal opportunities to compete to both the new entrant and the incumbent. Thus, the regulator's role in driving the sector towards the desired direction of lower long-distance tariffs cannot be marginalized.

Besides the decline in tariffs described above, there are other features of the tariff rebalancing process, which are noteworthy. For example, in January 2001, besides the decline in tariffs for intra-circle calls within 200 km radial distance, it was announced that subscribers were not required to have STD (subscriber trunk dialling) facility on their telephones for making calls within this area. This was also a positive step towards facilitating the spread of services.

As a result of competitive forces driving the market for long-distance services, the role of the regulator in tariff rebalancing, in recent years, has been limited to adjusting local call tariffs in the light of the drop in long-distance tariffs. The following discussion provides details of different aspects of tariff rebalancing for basic services.

Tables 5–9 bring out the following points.

- Since March 1999, the number of free calls has declined by 60% in both rural and urban areas.
- In rural areas, rentals have increased by 40% for exchanges up to 999 lines and by 20% for exchanges with 1 000–29 999 lines. In the case of general category, for exchanges with 30 000–99 999 lines, rentals have increased by about 45% and for exchanges with more than 100 000 lines rentals have increased by 55%.
- In urban areas, rentals for subscribers in exchange capacity of 1 000–29 999 lines have increased by 20%. For exchanges with more than 100 000 lines, rentals for general residential subscribers have increased by about 55%, whereas rentals for commercial users have increased by 72%.
- In January 2003, the regulator introduced the concept of concession for senior citizens under which rentals for fixed lines held by them remains unchanged at the level specified in April 2002.
- Local call charges have been increased by the regulator. The pulse rate for local calls has decreased over the years. The pulse rate for local calls prior to 1999 was 300 seconds. This was reduced to 180 seconds with TTO 99. It has been further reduced to 120 seconds from January 2003.

**Table 5** Change in the number of free calls

| Area | *1993 by DoT* | *1999 TTO 99* | *1999 by DoT* | *April 2002* | | *2003 24th amendment to TTO 99* | *2003 by BSNL* |
|---|---|---|---|---|---|---|---|
| | | | | *20th amendment to TTO 99* | *Free calls* | | |
| Rural | 125 | 75 | 125 | Non-commercial | 75 | 50 | 75 |
| | | | | Commercial | 45 | | |
| Urban | 75 | 60 | 75 | Non-commercial | 60 | 30 | 50 |
| | | | | Commercial | 30 | | |

DoT – Department of Telecommunication; TTO – Telecommunication Tariff Order 1999; BSNL – Bharat Sanchar Nigam Ltd

**Table 6** Change in monthly rentals for rural subscribers by exchange capacity (in rupees)

| Exchange capacity | 1993 Rates by DoT | 1999 |  | 1999 Rates by DoT | April 2002 20th amendment to TTO 99 | 2003 |  | 2003 Rates by BSNL |
|---|---|---|---|---|---|---|---|---|
|  |  | TTO 99 | Rental |  |  | 24th amendment to TTO 99 | Rental |  |
| Up to 999 lines | 50.0 | Low user | 70 | 50.0 | 70 | Senior citizen | 70 | 50 |
|  |  | General user | 70 |  |  | Others | 70 | 50 |
|  |  | Commercial user | 120 |  | 120 |  |  |  |
| 1 000–29 999 | 100.0 | Low user | 120 | 100.0 | 120 | Senior citizen | 120 | 110 |
|  |  | General user | 120 |  |  | Others | 120 | 110 |
|  |  | Commercial user | 160 |  | 160 |  |  |  |
| 30 000–99 999 | 137.5 | Low user | 180 | 137.5 | 180 | Senior citizen | 180 | 150 |
|  |  | General user | 180 |  |  | Others | 200 | 150 |
|  |  | Commercial user | 220 |  | 220 |  |  | 150 |
| 100 000 and above | 180.0 | Low user | 250 | 180.0 | 250 | Senior citizen | 250 | 210 |
|  |  | General user | 250 |  |  | Others | 280 | 210 |
|  |  | Commercial user | 310 |  | 310 |  |  | 210 |

DoT – Department of Telecommunication; TTO – Telecommunication Tariff Order 1999; BSNL – Bharat Sanchar Nigam Ltd

- Since March 1999, the number of free calls has declined by 60% in both rural and urban areas.
- In rural areas, rentals have increased by 40% for exchanges up to 999 lines and by 20% for exchanges with 1 000–29 999 lines. In the case of general category, for exchanges with 30 000–99 999 lines, rentals have increased by about 45% and for exchanges with more than 100 000 lines rentals have increased by 55%.
- In urban areas, rentals for subscribers in exchange capacity of 1 000–29 999 lines have increased by 20%. For exchanges with more than 100 000 lines, rentals for general residential subscribers have increased by about 55%, whereas rentals for commercial users have increased by 72%.
- In January 2003, the regulator introduced the concept of concession for senior citizens under which rentals for fixed lines held by them remains unchanged at the level specified in April 2002.
- Local call charges have been increased by the regulator. The pulse rate for local calls has decreased over the years. The pulse rate for local calls prior to 1999 was 300 seconds. This was reduced to 180 seconds with TTO 99. It has been further reduced to 120 seconds from January 2003.

**Table 5** Change in the number of free calls

|  |  |  |  | *April 2002* |  |  |  |
|---|---|---|---|---|---|---|---|
|  | *1993 by DoT* | *1999 TTO 99* | *1999 by DoT* | *20th amendment to TTO 99* | *Free calls* | *2003 24th amendment to TTO 99* | *2003 by BSNL* |
|  | 125 | 75 | 125 | Non-commercial | 75 | 50 | 75 |
|  |  |  |  | Commercial | 45 |  |  |
| Urban | 75 | 60 | 75 | Non-commercial | 60 | 30 | 50 |
|  |  |  |  | Commercial | 30 |  |  |

DoT – Department of Telecommunication; TTO – Telecommunication Tariff Order 1999; BSNL – Bharat Sanchar Nigam Ltd

**Table 6** Change in monthly rentals for rural subscribers by exchange capacity (in rupees)

| | *1993* | *1999* | | *1999* | *April 2002* | *2003* | | *2003* |
|---|---|---|---|---|---|---|---|---|
| Exchange capacity | *Rates by DoT* | *TTO 99* | *Rental* | *Rates by DoT* | *20th amendment to TTO 99* | *24th amendment to TTO 99* | *Rental* | *Rates by BSNL* |
| Up to 999 lines | 50.0 | Low user | 70 | 50.0 | 70 | Senior citizen | 70 | 50 |
| | | General user | 70 | | | Others | 70 | 50 |
| | | Commercial user | 120 | | 120 | | | |
| 1 000–29 999 | 100.0 | Low user | 120 | 100.0 | 120 | Senior citizen | 120 | 110 |
| | | General user | 120 | | | Others | 120 | 110 |
| | | Commercial user | 160 | | 160 | | | |
| 30 000–99 999 | 137.5 | Low user | 180 | 137.5 | 180 | Senior citizen | 180 | 150 |
| | | General user | 180 | | | Others | 200 | 150 |
| | | Commercial user | 220 | | 220 | | | 150 |
| 100 000 and above | 180.0 | Low user | 250 | 180.0 | 250 | Senior citizen | 250 | 210 |
| | | General user | 250 | | | Others | 280 | 210 |
| | | Commercial user | 310 | | 310 | | | 210 |

DoT – Department of Telecommunication; TTO – Telecommunication Tariff Order 1999; BSNL – Bharat Sanchar Nigam Ltd

**Table 7** Change in rentals for urban subscribers by exchange capacity (in rupees)

|  | *1993* | *1999* |  | *1999* | *April 2002* | *2003* |  |  |
|---|---|---|---|---|---|---|---|---|
|  | *Rates by DoT* | *TTO 99* | *Rental* | *Rates by DoT* | *20th amendment to TTO 99* | *24th amendment to TTO 99* | *Rental* | *2003 Rates by BSNL* |
| 1 000–29 999 | 100.0 | Low user | 120 | 100.0 | 120 | Senior citizen | 120 | 120 |
|  |  | General user | 120 |  |  | Others | 120 | 120 |
|  |  | Commercial user | 160 |  | 160 |  |  |  |
| 30 000–99 999 | 137.5 | Low user | 180 | 137.5 | 180 | Residential subscribers |  |  |
|  |  |  |  |  |  | • Senior citizens | 180 | 180 |
|  |  | General user | 180 |  |  | • Others | 200 | 180 |
|  |  | Commercial user | 220 |  | 220 | Commercial user | 220 | 180 |
| 1 00 000 and above | 180.0 | Low user | 250 | 180.0 | 250 | Residential subscribers |  |  |
|  |  |  |  |  |  | • Senior citizens | 250 | 250 |
|  |  | General user | 250 |  |  | • Others | 280 | 250 |
|  |  | Commercial user | 310 |  | 310 | Commercial user | 310 | 250 |

DoT – Department of Telecommunication; TTO – Telecommunication Tariff Order 1999; BSNL – Bharat Sanchar Nigam Ltd

**Table 8** Change in call charges for rural areas (in rupees)

| 1993 | | *TTO 99* | | *1999 Rates by DoT* | | *2003 24th amendment to TTO 99* | | *2003 Rates by BSNL* | |
|---|---|---|---|---|---|---|---|---|---|
| No. of bi-monthly calls | Rupees per 5 minutes | *Calls per month of billing cycle* | *Rupees per 3 minutes* | *No. of bi-monthly calls* | *Rupees* | *Calls per month of billing cycle* | *Rupees per 2 minutes* | *Calls per month of billing cycle* | *Rupees per 3 minutes* |
| Up to 250 | Free | Up to 75 | Free | Up to 125 | Free | Up to 50 | Free | Up to 75 | Free |
| 251–450 | 0.60 | 76–500 | 0.80 | 126–225 | 0.60 | 51–300 | 0.80 | 76–300 | 0.80 |
| 451–500 | 0.80 | Above 500 | 1.20 | 226–250 | 0.80 | Above 300 | 1.20 | Above 300 | 1.20 |
| 501–1000 | 1.00 | — | — | 251–500 | 1.00 | — | — | — | — |
| 1001–2000 | 1.25 | — | — | Above 500 | 1.20 | — | — | — | — |
| Above 2000 | 1.40 | — | — | — | — | — | — | — | — |

BSNL – Bharat Sanchar Nigam Ltd; TTO – Telecommunication Tariff Order 1999

**Table 9** Call charges for urban areas (in rupees)

| 1993 | | *TTO 99* | | *1999 Rates by DoT* | | *2003 24th amendment to TTO 99* | | *2003 Rates by BSNL* | |
|---|---|---|---|---|---|---|---|---|---|
| No. of bi-monthly calls | Rupees per 5 minutes | *No. of bi-monthly calls* | *Rupees per 3 minutes* | *No. of bi-monthly calls* | *Rupees* | *Calls per month of billing cycle* | *Rupees per 2 minutes* | *Calls per month of billing cycle* | *Rupees per 3 minutes* |
| Up to 150 | Free | Up to 60 | Free | Up to 75 | Free | Up to 30 | Free | Up to 50 | Free |
| 151–500 | 0.80 | 61–500 | 1 | 76–200 | 0.80 | 31–300 | 1.00 | 51–300 | 1.00 |
| 501–1000 | 1.00 | Above 500 | 1.20 | 201–500 | 1 | Above 300 | 1.20 | Above 300 | 1.20 |
| 1000–2000 | 1.25 | — | — | Above 500 | 1.20 | — | — | — | — |
| Above 2001 | 1.40 | — | — | — | — | — | — | — | — |

BSNL – Bharat Sanchar Nigam Ltd; TTO – Telecommunication Tariff Order 1999

- There has also been a rationalization of the categories for charging local calls.

As mentioned earlier, service providers can offer alternative tariff packages as long as they offer TRAI's standard package. Alternative tariff packages offered by service providers often involve tariffs lower than TRAI's standard package.

Table 10 provides a comparison of the standard package and one such alternative tariff package by the BSNL.

**Table 10** TRAI's (Telecom Regulatory Authority of India) standard package and BSNL's (Bharat Sanchar Nigam Ltd) alternative package: a comparison

| | *TRAI's standard package* (Rs) | | *BSNL's alternative package* (Rs) | |
|---|---|---|---|---|
| Rentals | *Rural* | *Urban* | *Rural* | *Urban* |
| **Rentals for residential subscribers** | | | | |
| Exchange system capacity ≤999 | 70 | 120 | 50 | 120 |
| Between 1000 and 29 999 | 120 | 120 | 110 | 120 |
| Between 30 000 and 99 999 | 200 | 200 | 150 | 180 |
| >100 000 | 280 | 280 | 210 | 250 |
| **Rentals for senior citizens** | | | | |
| Exchange system capacity ≤999 | 70 | 120 | 50 | 120 |
| Between 1000 and 29 999 | 120 | 120 | 110 | 120 |
| Between 30 000 and 99 999 | 180 | 180 | 150 | 180 |
| >100 000 | 250 | 250 | 210 | 250 |
| **Rentals for commercial subscribers** | | | | |
| Between 30 000 and 99 999 | 200 | 220 | 150 | 180 |
| >100 000 | 280 | 310 | 210 | 250 |
| Free calls (no.) | 50 | 30 | 75 | 50 |

Pulse rate for basic to basic calls: 180 seconds by BSNL as compared to TRAI's 120 seconds

**Source** BSNL (2003)

The above discussion reveals that a movement towards tariff rebalancing has taken place over the years. However, this process is not over as yet. Moreover, to the extent that service providers offer tariffs that are lower than TRAI's standard package, cross-subsidies have not been fully eliminated. Thus, the effectiveness of regulatory reforms has been limited because though cross-subsidies have declined and local call charges as well as rentals are below costs.

An important objective of the reforms, as also stated in the telecom policy, is to ensure the affordability of telecom services. Thus, when undertaking tariff rebalancing, it is also important to ensure affordability. However, what is of concern is sustained affordability. It can be seen from Tables 5–10 that the exercise of rebalancing tariffs for basic services has not been steep. Increase in rentals and local charges has been spread over the years. Further, the increase in rentals and local call charges has been minimized and it has been slow in the interest of affordability. For example, in the categories of exchange capacity with 30 000 or more lines, monthly rentals have been increased by about 11%–12% in the process of rebalancing undertaken in January 2003.

Moreover, rebalancing has ensured that the cost burden on long-distance calls, for which tariffs have declined significantly, does not become excessive making the fixed line service uncompetitive and unsustainable. This is in keeping with the principle of sustained affordability and with the classic goal of economic policy-making, which is to maximize social welfare, i.e. the sum of consumer and producer welfare.

Some of the stakeholders interviewed by us had expressed concerns about the effectiveness of tariff rebalancing that has eventually taken place. Even through long-distance tariffs have declined significantly over the years, tariffs for basic services are still not cost-based. Rentals are considerably lower than the cost-based rentals of 450 rupees per month. Revenues from long-distance calls that have been above costs have traditionally subsidized rentals, i.e. the cost of access. With a fall in long-distance tariffs, the ability of operators to cross-subsidize access has been severely constrained. This problem is of particular concern in the case of the incumbent. The regulatory framework is now attempting to provide for the declining cross-subsidy by way of access deficit charges.

### *Cellular services*

In the case of cellular services, prior to May 1999, the licence conditions for cellular services specified the tariffs in terms of 'price ceilings' – monthly rental of 156 rupees and a peak period airtime charge of 16.80 rupees per minute. Under this pricing structure, the peak-hour premium for a 5-minute call from a mobile to a PSTN (Public Switched Telephone Network) was as high as 61 times the price of a same-duration call from PSTN to PSTN and mobile networks. The pricing premium for mobile services was one of the crucial factors behind the relatively low subscriber penetration and low subscriber usage in India. In addition, while low monthly rentals attracted several unprofitable subscribers, high airtime/usage charges discouraged use and led to lower usage. Pricing flexibility was also restricted by the high-cost structure, which was an impediment in the way of expansion of usage (not access).

It was against this background that the TRAI undertook the issue of tariffs for cellular services in the consultation paper on telecom tariffs in September 1998. In this paper, it proposed to revise rentals and airtime charges based on its estimates of cost of access and airtime charges for cellular operators. In May 1999, TRAI increased monthly rentals from 156 rupees to 600 rupees per month and reduced the peak airtime charges from 16.80 rupees per minute to 6 rupees per minute.

Airtime charges declined by as much as 73% between 1996 and 2000 —from a standard peak-hour tariff of 16.80

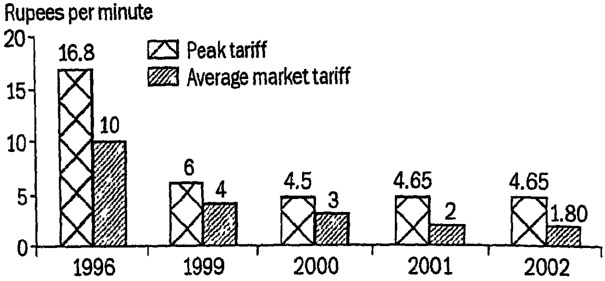

**Figure 1** Decline in cellular tariffs, peak tariff, and average market tariff
**Source** COAI (2003)

rupees per minute in 1996 to 4 rupees per minute (4.50 rupees in circles) by February 2000. Figure 1 shows the decline in peak tariff and average market tariff over the years. Overall, there has been a decline of over 75% in airtime rates from 1996. Airtime charges have declined by 88% in the metros and between 84% and 92% in the circles (TRAI 2002). It is also important to note that market tariffs have always been below TRAI standard tariff, which is also an indicator of the competitiveness of this market.

Overall, it can be seen that there has been a movement towards tariff rebalancing. This process has, however, been somewhat limited because subsidies have not been eliminated completely. The regulatory framework has also made attempts to find solutions that are viable for both operators and beneficial for consumers. In the case of long-distance and cellular services, tariffs have been driven by competition. Hence, tariff rebalancing has been pre-empted by competition. To the extent that the regulatory framework has facilitated growth and development of competition, it has played an important role in the process of tariff rebalancing.

## Impact on markets

Tariff rebalancing and facilitation of competition have been important objectives of the regulator. When assessing the

**Table 11** Domestic long-distance market: 1999-2003

| Size of market | *1998/99* | *1999/2000* | *2000/01* | *2001/02* | *2002/03** |
|---|---|---|---|---|---|
| Size of market (million rupees) | 124 460 | 122 700 | 123 800 | 128 278 | 105 153 |
| Size of market (million minutes) | 24 500 | 27 900 | 31 500 | 37 500 | 49 800 |

* estimates

**Source** Compiled by TERI from various sources.

impact of regulatory reforms on tariffs as well as competition, the impact on the market for different services is also to be considered. Decline in tariffs for long-distance services is not enough and it is important to ensure a sustained decline. In this regard, a comparison of the decline in tariffs with the change in the size of the market by way of call volumes as well as the revenue would be helpful. The following discussion provides such an analysis.

Table 11 shows the size of the domestic long-distance market from 1998/99 to 2002/03. Overall, the size of the long-distance market has increased by about three per cent between 1998/99 and 2001/02. At the same time, call minutes have increased by 53%. However, a comparative analysis of the change in the size of the market with the decline in tariffs shows that while tariffs have declined significantly, call minutes have not increased proportionately. In particular, revenues have not increased sufficiently to compensate for the decline in tariffs. The decline in the estimated revenues for 2002/03, in spite of an increase in call minutes, is of specific significance (Figure 2).

The above analysis gives the impression that the price elasticity for domestic long-distance services is not high. In such a scenario, the sustainability of decline in tariffs raises doubts. In addition, the trend for 2002/03 raises doubts on the nature and impact of competition on this market. While a rapid growth of revenues and call minutes is very much

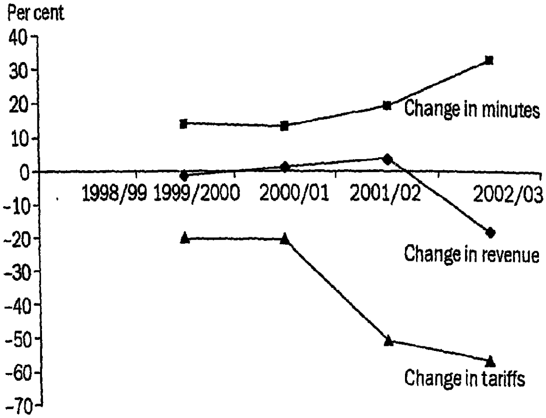

**Figure 2** Domestic long-distance market: change in tariffs and size of market in terms of revenue and minutes
**Source** DoT (2001, 2002, 2003)

possible in the future, continuation of such trends would raise serious threats to the sustainability of competition in this market.

A similar analysis for international long-distance services shows that price elasticity for this service is low. The volume of outgoing minutes has increased by 40% between 1989/99 and 2001/02. However, revenues have declined by about 11% during the same period. In the case of incoming calls, during the same period, the volume of minutes has increased by 53%. However, revenues have declined by more than six per cent. Table 12 throws light on the size of the international long-distance market.

When comparing the market for outgoing calls with the decline in tariffs, it can be seen that while the minutes for outgoing calls have increased substantially, revenues have shown a marginal decline till 2001/02. Estimates for 2002/03 show that revenues have declined significantly in 2002/03 (Figure 3). It is important to note that this segment was thrown open to unrestricted competition in April 2002.

**Table 12** International long-distance market: 1999–2003

| Size of market | *1998/99* | *1999/2000* | *2000/01* | *2001/02* | *2002/03** |
|---|---|---|---|---|---|
| Size of market (million rupees) | 62 492 | 62 870 | 64 833 | 57 667 | 49 900 |
| Size of market for incoming calls (million rupees) | 44 301 | 45 635 | 48 349 | 41 514 | 36 936 |
| Size of market for outgoing calls (million rupees) | 18 190 | 17 236 | 16 484 | 16 153 | 12 965 |
| Total volume of minutes (million) | 1 935 | 2 246 | 2 688 | 3 120 | 4 316 |
| Total volume of incoming minutes (million) | 1 499 | 1 773 | 2 161 | 2 508 | 3 484 |
| Total volume of outgoing minutes (million) | 436 | 473 | 527 | 612 | 833 |

* estimate

**Source** Compiled by TERI from various sources

Once again, the findings raise concerns about the sustainability of competition and of declining tariffs. In addition, continuation of such trends of lowering revenues would imply the need to re-examine the sustainability of lower tariffs and the nature of competition in this market.

## Beneficiaries of regulatory reforms

In order to assess this impact, we have attempted to examine whether states that were poor at the start of the reform

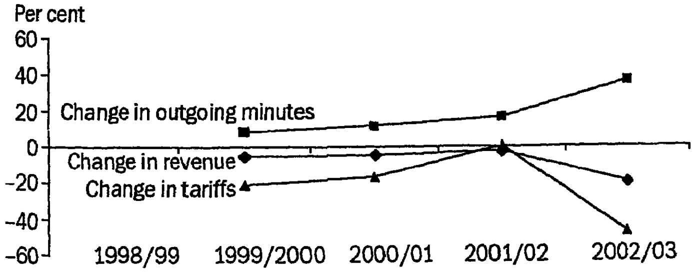

**Figure 3** International long-distance market: change in tariffs and size of the market in terms of revenue and outgoing minutes

process have benefited from an increase in availability of services. This exercise has been done for basic and cellular services. In the case of basic services, comparison has been made with respect to an increase in fixed DELs (direct exchange lines) and in the case of cellular services, the increase in the number of subscribers has been considered. Poor states have been defined as those that had a low PCNSDP (per capita net state domestic product). The relationships have been examined by using Spearman's rank correlation coefficient.

Table 13 computes the Spearman's rank correlation coefficient in the case of basic services. The hypothesis being tested is that increase in fixed DELs has been greater in states, which had a higher per capita net domestic product at the start of the reforms process, i.e. in 1994. States have been ranked on the basis of PCNSDP. States with higher PCNSDP in 1994 have been given a higher ranking. Similarly, when ranking states on the basis of increase in DELs, states where there has been a greater increase in DELs have been ranked higher.

Spearman's rank correlation coefficient $= 1-\frac{6\Sigma d^2}{n(n^2-1)}=-0.188$

where

d = difference between ranks

n = number of observations = 18

The negative correlation coefficient ( 0.188) implies weak inverse relation between income and increase in DELs. As a result, it can be concluded that an increase in fixed DELs has not been limited to states that had a higher PCNSDP in 1994. In other words, the spread of basic services has benefited not only the richer states but also the states that were poor at the start of the reform process.

**Table 13** Spearman's rank correlation coefficient for spread of basic services

| States/Metros | *PCNSDP (at current prices) 1993/94* (Rs) | *Rank on the basis of PCNSDP in 1993/94* | *Increase in DELs between 1993/94 and 2000/01* (%) | *Rank on the basis of increase in DELs* | *Difference in ranks* | *Square of difference* |
|---|---|---|---|---|---|---|
| Andhra Pradesh | 7 447 | 13 | 395 | 5 | 8 | 64 |
| Assam | 5 715 | 16 | 360 | 9 | 7 | 49 |
| Bihar | 8 935 | 9 | 386 | 7 | 2 | 4 |
| Delhi | 18 021 | 2 | 128 | 18 | (16) | 256 |
| Gujarat | 9 796 | 7 | 271 | 16 | (9) | 81 |
| Haryana | 11 090 | 6 | 313 | 13 | (7) | 49 |
| Himachal Pradesh | 7 870 | 11 | 400 | 4 | 7 | 49 |
| Karnataka | 7 838 | 12 | 393 | 6 | 6 | 36 |
| Kerala | 7 938 | 10 | 304 | 14 | (4) | 16 |
| Madhya Pradesh | 13 116 | 3 | 196 | 17 | (14) | 196 |
| Maharashtra | 12 183 | 5 | 369 | 8 | (3) | 9 |
| North East | 44 147 | 1 | 408 | 3 | (2) | 4 |
| Orissa | 4 797 | 18 | 344 | 12 | 6 | 36 |
| Punjab | 12 710 | 4 | 345 | 11 | (7) | 49 |
| Rajasthan | 6 182 | 15 | 281 | 15 | – | – |
| Tamil Nadu | 8 943 | 8 | 453 | 2 | 6 | 36 |
| Uttar Pradesh | 5 050 | 17 | 355 | 10 | 7 | 49 |
| West Bengal | 6 756 | 14 | 785 | 1 | 13 | 169 |

PCNSDP – per capita net state domestic product; DELs – direct exchange lines

Figures in parentheses represent negative values.

*Note* North East includes the states of Arunachal Pradesh, Nagaland, Mizoram, Tripura, Meghalaya, and Manipur.

## Conclusions

Several areas and issues have been examined with the objective of ascertaining the impact and effectiveness of regulatory reforms in the telecom sector. An assessment of the goals of the telecom policy as against the outcomes has been carried out. This assessment brings out the following points.

- Availability of services has increased with regulatory reforms. The targets of rural teledensity as laid down by NTP 99 will be more than achieved. The rural–urban divide remains. The regulatory framework has failed to deliver in respect of universal service obligations.
- The need for pursuing tariff rebalancing remains and though cross-subsidies have declined, they have not been fully eliminated.
- Competition has increased in all segments of the sector but the framework for competition is not yet stable. The impact of regulations currently under review by the regulator remains to be seen.
- Quality of service standards need to be enforced. Little has been achieved in respect of grievance mechanisms for consumers. Greater dissemination of the results of monitoring the performance of service providers would help consumers make informed choices.
- Regulatory reforms have benefited uneconomic and backward areas.

# Multi-sector regulator

Regulation in India has come so far in the shape of SSRs (single-sector regulators). There are separate regulators for electricity, telecom, ports, insurance, and financial securities. The electricity sector also has separate regulators for each state apart from one central regulator. The common feature of these regulatory bodies is that they are located outside the government and in several areas their decisions are final. As similar regulatory bodies are being contemplated in other sectors, the question naturally arises as to how far is it desirable that these regulatory bodies be merged. This chapter, organized as follows, attempts to address this question.

- Definition of an industry, sector, and an MSR (multi-sector regulator).
- A brief review of international experience and the lessons that can be drawn from there.
- The advantages and disadvantages of MSR.
- A brief discussion of the Indian context.
- The case study of Maharashtra.
- Conclusions as to where the MSR concept is likely to succeed.

## Definitions

Defining an industry is not easy. Ideally the definition depends on the purpose; whether it is to compute the level of activity in the industry, or the price level, or the concentration ratio. The strict definition of an industry would be a group of units producing the same product. However, from the point of view of assessing consumption parameters like price and quality, the definition would have to be extended to units producing products with a high degree of substitutability.

### *Definition of industry*

In the context of regulation it is this definition that is important—one that links the market to the industry. Essentially a regulator is required to lay down the rules of the market, and where there is not enough competition to also regulate supply including price-setting. Thus, for our purposes, an industry is one, which comprises units whose products have close substitution possibilities in consumption (Scherer and Ross 1990; Samarajiva and Henten 2002). An industry can also be defined as one that has production substitutability. Thus, if there are production units, which compete for similar resources, there may be a case for regulation to ensure that this competition is fair. However, such instances are rare and generally regulation is done only for industries that are likely to abuse their monopoly power in not allowing consumers a fair choice.

### *Definition of sector*

Going beyond the definition of an industry, we also need to clarify what is meant by a sector. Sometimes electricity is referred to as a sector while at other times the whole of the energy group of activities is referred to as a sector. In the present context, a sector could mean a group of similar industries, i.e. the test being a high degree of consumer substitution. It could also mean a group of industries that have strong vertical linkages. Thus, the energy sector can be so described because of the strong vertical linkages between the primary and secondary processors of energy. The different market structures, import regimes, and administrative arrangements for different industries have to be taken into consideration too. Though there could be considerable substitution possibilities between coal and the oil and gas producers, the market structures are totally different. Further, with limited oil reserves, the dependence on imports is much more in the case of oil, while in the case of coal this is rising due to factors other than availability of resources. The linkage of domestic oil prices with international prices is, therefore, much closer. Oil and gas can, therefore, be regarded as an industry as distinct from coal though both can be regarded as part of the wider energy sector.

### *Definition of multi-sector regulator*

In understanding the potential advantages and disadvantages of an MSR, the term sector would also cover industry in this section. Thus, an MSR could cover many sectors or even many industries belonging to the same sector. As a 'sector' is defined as a group of similar industries or one where strong vertical linkages exist among a group of industries, electricity, coal, and oil and gas are different industries forming part of the wider energy sector. It is also important that all three have different ministries at the central government and different administrative arrangements. Similarly, airlines, road, rail, sea, and inland water are different industries belonging to the larger transport sector; most of these have dedicated ministries at the central level.

An MSR can be defined as one whose jurisdiction covers different industries or sectors. Thus, an energy regulator would classify as an MSR as it would cover different energy sectors or industries.

## International experience

In this section, multi-sector regulatory bodies set up and operational in some of the other countries across the world have been studied. The detailed country experiences are given in Annexe II. The countries covered are listed below.

1. Australia
2. Canada
    - federal level
    - Ontario at the state level
3. Hungary
4. Italy
5. Jamaica
6. United Mexican States
7. UK (United Kingdom)
8. USA (United States of America )
    - federal level
    - four states selected for the purpose of the study are California, New York, Massachusetts, and Washington
9. Spain
10. Sri Lanka

These countries can broadly be classified into the following two categories.

- *Category A* Countries where the regulator was established to regulate more than one sector from the very beginning.
- *Category B* Countries where the regulator was not established as an MSR from its inception and different sectors were gradually brought under its ambit.

### Category A

Countries that had an MSR from their inception include Canada (both at federal and state levels), Hungary, Italy, Spain, the UK and the US (federal and state levels in New York, Massachusetts, and Washington).

In most of these countries, the regulators are mainly responsible for the energy sector, i.e. electricity and oil and natural gas. It is only at the state level in the US that the regulators are regulating other sectors such as water, solid waste collection, environment, telecom, steam, cable television, and transportation.

The regulators regulating only the energy sectors also differ from each other in terms of their organizational structure. In Italy and Spain, the regulatory authority has established separate divisions for the different sectors it regulates. Along with setting up divisions for the sectors regulated, Italy and Spain have also set up separate divisions related to services like administration and personnel, external relations, regulation and competition, documentation and research, and legislative and legal services. However, Canada (federal and state levels), Hungary, UK, and USA (federal level) do not have such separate divisions for each sector regulated by the regulator.

As mentioned earlier, it is only at the state level in the US (New York State, Massachusetts, and Washington) that regulators are regulating sectors other than energy. New York and Massachusetts have established separate divisions for the different sectors. They have also set up separate divisions for services like legal, consumer education and advocacy, administrative, human resources management, information services, and communications. Among the four states selected for this study within the US, Washington is the only one that does not have separate divisions for each of the sectors regulated by the regulator.

### *Category B*

These are countries like Australia, Jamaica, United Mexican States, and the state of California in the US where the regulator was not established as an MSR from its inception and different sectors were gradually brought under its ambit.

The regulator regulates only the energy sectors, i.e. electricity and gas in the United Mexican States. In Australia, California, and Jamaica, the regulator also regulates other sectors like transport, water, grain, telecom, sewerage, and environment.

Regulatory authorities in Australia, California, and the United Mexican States have established separate divisions for the sectors being regulated. In Jamaica, the regulator has an organizational set up different from most of the other countries; the water, transport, and electricity sectors have been clubbed together but segregated from telecommunications. This could be due to the faster growth of the telecommunications sector as compared to the other sectors, may be because of rapid technological changes.

United Mexican States has also set up separate divisions for services like legal, administration, management, and development. Australia has divisions for price review and corporate services that, in turn, includes finance, human resources, business planning, administration, and freedom of information. The Californian regulator is organized into several advisory units, an enforcement division, and a strategic planning group.

Table 1 summarizes the discussion above. There are countries where MSRs exist at both the federal and state levels, like Canada and the US. Table 1 shows that the federal- and state-level regulators in these countries are responsible for regulating different sectors and their organizational structure and functions are also different sometimes; i.e. differences exist in the regulatory set-up in the same country at the federal and state levels.

A study of the international experience also shows that in most countries, the regulator has set up separate divisions for services along with separate divisions for sectors. In all countries, the regulator employs staff with diverse skills and generally includes economists, engineers, accountants, lawyers, auditors, financial analysts, consumer complaint specialists, and administrative staff.

As far as Sri Lanka is concerned, a National Transportation Commission and a Telecom Regulatory Commission already exist. An MSR has been proposed in the country. The PUCSL (Public Utilities Commission of Sri

**Table 1** Summary of international experience on MSR (multi-sector regulator)

| Description | *Organizational structure* | *MSR since inception* | *Single sector regulator at the time of inception* |
|---|---|---|---|
| Regulating only energy sectors | Separate divisions for sectors regulated | Italy and Spain | United Mexican States |
| | No separate divisions for sectors regulated | Canada (federal and state levels), Hungary and US (federal level) | UK |
| Regulating sectors other than energy | Separate divisions for sectors regulated | States of New York and Massachusetts in the US | Australia, California, and Jamaica |
| | No separate divisions for sectors regulated | State of Washington in the US | |

Lanka) will cover the sectors of electricity, water, petroleum, transportation, ports and marine services, and airports and aviation services. However, the Constitutional Council's decision is still awaited, and, therefore, the PUCSL is not operational as yet. The commission will consist of five members defined by subject expertise and experience, and a director general. The policy directions may be given to the PUCSL only by the cabinet in writing and in consultation with the sector ministry.

The issue of reporting these MSRs to the relevant ministries has also been looked into in the international experience. In Mexico, the CRE (Regulatory Commission for Energy) was established as an agency of the Energy Secretariat but it enjoys technical, operational, and budgetary autonomy. The commissioners are, however, appointed by the President of Mexico. In Jamaica, OUR

(Office of Utilities Regulation) reports to the 'responsible minister', which means a minister having portfolio responsibility for a particular utility service.

At the federal level in Canada, the NEB (National Energy Board) is accountable to the Parliament, and reports to it through the Minister of Natural Resources (natural resources, energy, minerals and metals, forests, and earth sciences). At the state level, the OEB (Ontario Energy Board) reports to the Legislature through the Minister of Energy, Science, and Technology. The OEB has regulatory oversight of both natural gas and electricity matters in the province and also gives advice on energy matters referred to it by the Minister of Energy, Science, and Technology and the Minister of Natural Resources.

In Hungary, the Hungary Energy Office is controlled by the government and supervised by the Minister of Economic Affairs. In the UK, while Ofgem (Office of gas and electricity markets) is sponsored by the DTI (Department of Trade and Industry), it reports to the Minister of State for Energy, e-Commerce, and Postal Services who is the responsible minister within the DTI. The FERC (Federal Energy Regulatory Commission) of the US is an independent regulatory agency officially organized within the Department of Energy. The CNE (National Energy Commission) of Spain is attached to the Ministry of Economy, which monitors the efficiency of its activities.

### Rationale of a multi-sector regulator

The case for an MSR has been made on several grounds, principal among these being the fact that it has been successful. In the US, the concept of an MSR had existed at the state level for almost a century. Similarly, in the UK, experience with SSR led to the merger of the oil and gas, and electricity sector regulators. The advantages and disadvantages of having an MSR discussed in the following paragraphs have been culled from the existing literature

(Samarajiva and Henten 2002; Schwartz and Satola 2000; Smith 1997) and the feedback obtained from the case study of Maharashtra discussed later in this publication.

*Regulatory Skills* are said to be in short supply. Therefore, it makes sense to have an MSR to make best use of these skills. Common problems relating to economics, law, and finance can be tackled by a central pool, which can lend its services to the various sectors or industry-specific problems. It can also be argued that the narrow technical skills required for regulation can be outsourced, and, in fact, many regulators in India have made extensive use of outside expertise. In the same vein, keeping in mind the fact that the regulator has to play a role in the development of the sector, more than regulatory skills, what is required is knowledge of the sector, its problems, and the capacity to ensure its development to meet the objectives of government. These factors would prompt the need for an SSR.

Regulatory capture, by the government or by the industry is said to be easier when there are SSRs, since these are smaller and more closely identified with one industry or department of the government. There is also a counter view. It must be remembered that in India the problems of regulation are different. In both the telecom and power sectors, public-owned utilities did not have a rational tariff and one of the main outcomes expected from the regulatory process was the rectification of this tariff imbalance. Thus, the greater danger, which needs to be guarded against, is the creation of a tariff structure that is not sustainable. It is not clear whether there is any clear advantage in having an MSR in this context.

Financial costs can also be much lower with an MSR since common resources can be economized. *On the other hand,* it can also be argued that these costs are so small in relation to the turnover of the sectors, thus the saving from these cannot be a material input affecting the choice of an SSR or MSR.

Convergence of technologies or markets can be a very powerful argument for an MSR. Therefore, in areas like telecommunications, information technology, and broadcasting, it would be difficult to have SSRs because the same resource can be put to multiple use.

Uniformity in rules can also be useful when there are several industries that compete with each other. Such uniformity makes for fair competition as different rules can give one or the other sector an unfair advantage. Thus, in India, coal and oil can be said to be competing in certain segments.

Vertical integration can give a powerful impetus to the creation of an MSR if all the segments require a similar degree of regulation. Thus, in the energy sector in India, there are strong vertical linkages between the electricity and the coal industries. Both require regulation due to the absence of competitive markets. Without a common regulatory structure, many issues regarding coal supply, which impact the electricity consumers, are not being addressed (Sarkar and Chand 2003).

Accessibility to the regulator is an important factor, especially in the early stages when important facets of the regulatory policy are being thrashed out. This emerged as a powerful argument in the Maharashtra case study, as to why, at least to start with, it would have been better to have an SSR.

## The Indian context

Regulation in India, through specialized regulatory agencies, is a recent phenomenon. Excluding the financial sector, such bodies exist only in three sectors – telecom, ports, and electricity. Given the federal character of the Indian constitution, some subjects are with the central government, some with the state, and others are concurrent. Of the three sectors referred to above, two – ports (only major) and telecom – are central subjects. Thus, state governments are involved in regulation only in the electricity sector.

The possibilities of having an MSR cutting across state and central boundaries are remote. In fact, the first recommendation for setting up electricity regulators was to have them at the regional level. When this did not materialize, state-specific regulators were set up. Thus, the possibility of an MSR has to be confined to a set of sectors either at the central or state levels.

At the central level, apart from the sectors already referred to, there is a bill pending for setting up a petroleum regulator having the following functions.

- Protect the interests of consumers by fostering fair trade and competition.
- Authorize entities to take up marketing of notified products, establish LNG (liquefied natural gas) terminals and set up common carriers; it would also have the function of declaring pipelines as common carriers.
- Regulate the common carriers in terms of access and transportation rates.
- Ensure adequate availability and equitable distribution of notified petroleum products; to also monitor prices and take corrective measures to prevent profiteering.

In the coal sector, a bill is pending for allowing the private sector into coal mining for merchant sale (at present it is only allowed for captive use) but there is no proposal for a regulator.

Apart from the energy sector, there is a proposal for an MSR for the rapidly converging sectors of telecom, information technology, and broadcasting.

In the states there are proposals for private sector participation in several sectors, mostly relating to urban and municipal services. However, there is no specific proposal to establish a regulator. Some studies have been conducted in this direction, the most comprehensive of these being the Government of Maharashtra report on rural and urban water supply schemes, hereafter referred to as the SCR (Sukthankar Committee Report).

## Case study of Maharashtra

The SCR considered the issue of setting up an MSR and concluded that:

> *Initially, the Committee recommends an independent MWRC (Maharashtra Water Regulatory Commission). However, its integration with the Maharashtra Electricity Regulatory Commission may be considered later on after a detailed review. Such convergence of regulation may enable sharing of cross-sectoral experiences and also reduce the cost of regulation.*

As of now, the government has not taken a decision on this issue and the sector continues to be regulated by it directly. However, the question can still be asked whether it would be desirable to introduce an SSR for the water sector or convert the electricity regulator into an MSR. Before this is done, it would be useful to give a brief background of the water and the electricity sectors to understand the issues facing these sectors which a regulator would be expected to address.

### *Water sector*

In the rural areas, the problems that confront the sector are several. Coverage itself is an issue as only 55% of the villages and 65% of the neighbourhoods have a supply of less than 40 LPCD (litres per capita per day). This apart, quality is suspect. According to tests conducted by the State Public Health Laboratory in 1999, about 40% of the samples were found to be contaminated. There are several multi-village piped water supply schemes; in many the pressure is very low. According to a master plan, the investment required for rural areas is of the order of 84 490 million rupees. The MJP (Maharashtra *Jeevan Pradhikaran*) is the main agency for implementing drinking water supply schemes. It has not been able to adhere to the schedule laid down because of shortage of funds. Many of the schemes completed by it have not yet been handed over to the local bodies. They, in turn, are reluctant to do so because of lack of funds to meet the operational costs. The MJP has borrowed heavily, and the cost of servicing these loans has been shouldered by it with support of state governments. Cost recovery has been poor in the multi-village schemes implemented by the MJP, while it has been better in the single-village schemes where community participation has been better.

In many schemes, maintenance has been a victim and this, in turn, has impacted the reliability of supply. Sustainability of the source has been an issue in many of the rural areas and this has come about because of unsustainable extraction practices. With over 90% of the rural water supply schemes being dependent on groundwater, this is a major issue for these schemes. These issues, in turn, go far beyond the drinking water supply schemes and are linked to the agricultural policies and regulation of groundwater extraction. The state has a Groundwater Survey and Development Agency, which, apart from carrying out surveys, is also responsible for implementing the GWA (Groundwater Act) of 1993. While the Agency has been carrying out surveys and assessments periodically, it has not been able to implement the GWA effectively.

Maharashtra has a large urban population and as per the 1991 census, 38.69% of the population is in urban areas against the national average of 25.71%. This population resides in 15 corporations and 245 councils—the latter are in categories A, B, and C. Only 2 of the 15 corporations have been able to meet the norm of 177 LPCD. Water supply is also restricted and there is no city that offers round-the-clock supply. Like the rural areas, water quality is also a problem; 10% of the water samples in the urban areas are found to be contaminated.

Cost recovery is a problem that urban Maharashtra (except for Mumbai) faces like their rural counterparts. The SCR has estimated that tariffs would have to be raised by 2–2.5 times by the urban local bodies to break even. Both the local bodies and the state government have poor financial health and are, therefore, not able to provide funds for approved works. The limited funds are spent mainly on new works with little money leftover for maintenance.

In order to meet these varied challenges, the SCR in 2001 recommended a series of measures, including the establishment of an SSR for the water sector. Among the recommendations were setting up CWSEs (city/regional water supply entities) for the various supply areas; these would have monopolies in their respective areas. CWSEs could be separate municipal enterprises, companies with a license from the urban local body, a co-operative, or a concessionaire. These recommendations are being examined and debated. The major tasks of the proposed water regulator are as follows.

- Fixing tariffs for the urban areas and all multi-village schemes
- Ensuring quality of supply
- Issue and regulation of licenses
- Coordination with other regulators on the environment side specially relating to drinking water quality and waste water disposal standards
- Collection and dissemination of information to provide transparency.

### *Electricity sector*

Electricity supply in Maharashtra can be broken up into areas covered by the MSEB (Maharashtra State Electricity Board) and the other suppliers, which cater to the city of Mumbai. The bulk of the regulation done so far has been in the operations of the MSEB. The Government of Maharashtra had established a regulatory commission for the electricity sector in 1999. This commission was set up under the ERC (Electricity Regulatory Commissions) Act, 1998. The MERC (Maharashtra Electricity Regulatory Commission) has so far passed two tariff orders apart from several other orders on other issues.

The major problems faced by the MSEB are shortage of electricity, especially peak power, and the financial problem of under-recovery of cost. The two problems are interrelated because new investments cannot come unless there is demonstrated paying capacity. After the Enron case, the viability of packages like government guarantees has been seriously eroded.

The revival of financial health, in turn, depends on reducing T&D (transmission and distribution) losses and reducing the under-recovery from the agricultural consumers. T&D losses had been projected at 15%–17% in the mid-1990s. This was subsequently increased to 30.5% in 1998/99. However, the MSEB later on revised this estimate to 39% in the tariff petition filed 2001/02. The MERC has allowed only a part of this loss to be borne by the consumers and a significant portion is borne by the MSEB. The other problem is low tariff for the agricultural sector. The MERC had increased the tariff for these consumers, but instead of passing this on to the consumers the government subsidized the MSEB tariff.

The structure of the electricity industry has remained as it was with the exception of the MERC having taken over the functions assigned to it under the ERC Act. Thus, the MSEB remains a Board under the E(S)A [Electricity (Supply) Act] (1948), combining in itself the functions of generation, transmission, and distribution.

### *Case for and against an MSR*

The striking feature of all interactions with the various stakeholders revealed a strong support for an SSR to start with primarily because of the complexity of the water sector.

It was felt that with the various physical, financial, and institutional problems faced by the two sectors, it would not be possible at this stage to have an MSR. For it would not only mean neglect of the various problems the water regulator would have to deal with, but could also lead to loss of focused attention that the MERC had been able to give to the electricity regulator. Thus, the progress made so far in the electricity sector would be lost. Essentially what this meant was that the need for sector expertise and attention would far outweigh the advantages of pooling the 'pure' regulatory skills. Thus, the use and application of different methods for tariff setting could be borrowed by the water regulator from the experience of the MERC. Further, given the peculiar circumstance of Mumbai, staffing is a problem. Thus, the MERC gets a lot of the 'technical' work done by consultants. The pool of the consultants' knowledge in the electricity sector could easily be used by the water regulator.

The risks of regulatory capture seem to be evenly divided between an SSR and an MSR. Neither regime has obvious advantages. The problem in both the sectors is not so much the risk of over-recovery as under-recovery. As mentioned earlier, in the electricity sector, the government has prevented the pass through of the hike in agricultural subsidy to the consumers by giving a subsidy, as provided under the ERC Act. Therefore, the risk of capture has to do more with a regulator keeping the agricultural electricity tariff and water tariff low. Also even when the regulator does rationalize the tariff, there is no guarantee that it would be passed on to the consumers.

Given the vast number of local bodies involved in this exercise, it is remote that an SSR would be captured by all of them. On the other hand, there would be a good case to argue for an SSR to get into the individual details of tariff setting for so many local bodies. Thus, the style of functioning of the regulator in the water sector would be very different from the MERC, where there is a greater degree of centralization of tariff setting owing to the technical characteristics of the sector.

The financial costs of MERC are quite small—about 20 million rupees per annum. Interestingly, the costs of consultancy are in the range of 0.2–0.4 million rupees a year, which is just a little below the salary costs. Thus, by having an MSR, costs are unlikely to come down significantly as compared to having two SSRs. This is even smaller when compared to the huge investments that the regulators have to oversee and similarly the huge investments that the regulator is expected to catalyse.

Convergence of technologies or markets is not very relevant in this context as the two sectors are very different. Similarly, uniformity in rules will not apply as there is no competition between the two sectors.

Vertical integration is relevant here as energy costs are a significant component of the operation costs of water supply schemes. Similarly, there is a close connection between the current tariff regime of unmetered supply and the wasteful use of water leading to depletion and source failure in water supply schemes. This makes a case for an MSR.

Accessibility to the regulator is a strong argument for an SSR. Given the large number of localized issues that the water regulator will be dealing with, it would be difficult for an MSR to provide the degree of transparency and satisfaction that an SSR can provide.

From the above analysis, it would appear that the SCR recommendation of having an SSR for the water sector is sound. The possibility of its conversion into an MSR could be considered after gaining some experience. The key to realizing the benefits of an MSR, which can take a consistent view, lies in a good coordination mechanism. Thus, legislation can provide for mandatory consultation by the MERC with the water regulator on these issues. Such coordination, of course, can break down but the disadvantage of this far outweighs the advantages of having an SSR.

## Conclusions

- There are several advantages and disadvantages of having an MSR. These are specific to the sectors and industries being considered, especially the level of development and the nature of problems. Of equal importance is the degree of interconnectedness of the industries and sectors being considered.
- It is thus clear that it would not be possible to provide a uniform prescription for all sectors for all times. As is evident from the case study of Maharashtra, while there is little advantage in having an MSR today, this may become feasible after some years when the major issues facing the two sectors have been sorted out and no large changes are expected in terms of regulatory control.
- At present, in the states, the sectors that are likely to get independent regulators are those dealing with municipal services—drinking water, roads, solid waste management, etc. In these sectors, there is very little by way of common problems with the electricity sector. On the other hand, there would be a great deal of localized problems, which could vary depending on the state of development of these facilities in a particular city. Moreover, these regulators would have to interact closely with the elected municipal bodies who have a certain degree of constitutional protection. In the case of water, there would be the added dimensions of having to coordinate with the use of water for agriculture.
- In contrast, at the central level, purely in terms of making better use of regulatory skills, there is a strong case for an MSR. In the energy sector, there is both a certain degree of consumer substitutability as well as a high degree of vertical integration between the various components of

the sector. However, because of the administrative structure, which provides for different ministries for different industries, it is unlikely that an MSR would emerge in the near future. This would become possible if an integrated energy policy structure is put in place; a beginning in this direction has been made in the Tenth Plan document, which recognizes the need for such a structure.

- In contrast, in the communications/information technology sector, the idea of an MSR at the central level has been readily proposed even though there are separate ministries for various aspects of this MSR. The driving force here has been the role of technology, which has created the pre-conditions for an MSR. This shows that where the condition of the market or the technology is such, an MSR can be created notwithstanding the separation of the administrative functions in the government.
- Such conditions are likely to be rare. In practice, SSRs are likely to be created corresponding to the functions of an administrative ministry or department. Since there is always some degree of consumer substitution or vertical linkages, there would be a strong case for a coordinating mechanism between the different regulators. Such a coordinating mechanism can also be useful in merging the SSRs into an MSR. It may be seen from international experience that in several countries, an MSR has been created out of SSRs and it is likely that in India too this trend will be followed.

Table 2 gives a summary of the multiple sectors being regulated by a single regulatory body in different countries across the world.

**Table 2** Sectors regulated by the multi-sector regulatory bodies in different countries

| | | *USA* | | | | | | | *Canada* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Australia* | *Federal* | *New York (State)* | *Massachusetts (State)* | *California (State)* | *Washington (State)* | *Spain* | *Jamaica* | *Federal* | *Ontario (State)* | *Italy* | *UK* | *United Mexican States* | *Hungary* |
| Electricity | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Telecom | – | – | ✓ | ✓ | ✓ | ✓ | – | ✓ | – | – | – | – | – | – |
| Cable television | – | – | ✓ | ✓ | – | – | – | – | – | – | – | – | – | – |
| Oil | – | ✓ | – | – | – | – | ✓ | – | ✓ | – | – | – | – | – |
| Gas/Natural gas | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | – | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Transportation | ✓ | – | – | ✓ | ✓ | ✓ | – | ✓ | – | – | – | – | – | – |
| Rail | ✓ | – | – | – | ✓ | ✓ | – | – | – | – | – | – | – | – |
| Passenger transportation | – | – | – | – | ✓ | ✓ | – | ✓ | – | – | – | – | – | |
| Ports | ✓ | – | – | – | – | – | – | ✓ | – | – | – | – | – | – |
| Water | ✓ | – | ✓ | – | – | ✓ | – | ✓ | – | – | – | – | – | – |
| Solid waste collection | – | – | – | – | – | ✓ | – | – | – | – | – | – | – | – |
| Sewerage | – | – | – | – | – | – | – | ✓ | – | – | – | – | – | – |
| Environment | – | – | – | – | ✓ | – | – | – | – | – | – | – | – | – |
| Grain | ✓ | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Steam | – | – | ✓ | – | – | – | – | – | – | – | – | – | – | – |

# Annexe I

## Quality of service standards as specified by the Telecom Regulatory Authority of India

## For basic telecommunication services

| Parameter | *Short term (before the end of 12 months)* | *Intermediate term (before the end of 24 months)* | *Long term (before the end of 48 months)* | *Average over a period of* |
|---|---|---|---|---|
| Provision of a telephone after registration of demand | <21 days | <15 days | — | — |
| Fault incidences (no. of faults/ 100 subscribers/month | <12 days | <7 days | <7 days | One quarter |
| Fault repair by next working day | >85% | >87% | <3% | One quarter |
| *Mean time to repair* | *<24 hours* | <12 hours | >90% | One month |
| *Dial tone delay* | *0.9 probability of not* exceeding 600 ms (milli second) with a mean value of ≤400 ms | 0.92 probability of not exceeding 600 ms with mean value of ≤400 ms | <8 hours | One quarter |
| Grade of service | ■ Junction between local exchanges 0.002<br>■ Outgoing junctions from TAX to local exchange — 0.005<br>■ Incoming junctions from local exchange to TAX— 0.005<br>■ Incoming or outgoing junctions between TAX's 0.005 | Same as short term | Same as short term | One quarter |

| | | | | |
|---|---|---|---|---|
| | ■ Switching network should be non-blocking or should have extremely low blocking probability | | | |
| Call completion rate within a local network should be better than | >55% | >60% | >65% | One billing cycle |
| Metering and billing credibility | Not more than 0.2% of bills issued should be disputed over a billing cycle | Not more than 0.15% of bills issued should be disputed over a billing cycle | Not more than 0.1% of bills issued should be disputed over a billing cycle | One month |
| Operator-assisted trunk calls | Urgent calls <1 hour 30 minute delay | Urgent calls <1 hour 15 minute delay | Urgent calls <1 hour delay | One month |
| | Ordinary calls <2 hours 30 minute delay | Ordinary calls <2 hours 15 minute delay | Ordinary calls <2 hours delay | |
| Response time to other operator assisted services | 85% calls <10 second | 90% calls <10 second | 95% calls <10 second | |

*Continued*

## For basic telecommunication services (*continued*)

| Parameter | *Short term (before the end of 12 months)* | *Intermediate term (before the end of 24 months)* | *Long term (before the end of 48 months)* | *Average over a period of* |
|---|---|---|---|---|
| Customer care (promptness in attending to customers requests) 95% of requests | | | | One month |
| ■ Shifts | <7 days | <5 days | <3 days | — |
| ■ Closures | <24 hours | <24 hours | <24 hours | — |
| ■ Additional facility | <48 hours | <36 hours | <24 hours | — |
| Repeat faults | <2% | <1.5% | <1% | One month |
| Customer perception of services | | | | |
| ■ Satisfied with the provision of service (%) | >80 | >90 | >95 | |
| ■ Satisfied with the provision of billing performance (%) | >80 | >85 | >90 | |
| ■ Satisfied with the help service (%) | >80 | >85 | >90 | |
| ■ Satisfied with network performance, reliability, and availability (%) | >85 | >90 | >95 | |
| ■ Satisfied with maintainability (%) | >85 | >90 | >95 | |
| ■ Overall customer satisfaction | >80 | >85 | >95 | |
| ■ Customer satisfaction with offered supplementary services % satisfied | >80 | >85 | >95 | |

TAX – tandem exchange

## For cellular mobile telephone services

| Parameter | *Short term (before the end of 12 months)* | *Intermediate term (before the end of 24 months)* | *Long term (before the end of 36 months)* | *Average over a period of* |
|---|---|---|---|---|
| Fault incidence and repair | | | | |
| ■ Fault incidence (no. of faults/100 subscribers/month) | <3 | <2 | <1 | One quarter |
| ■ Faults cleared within 24 hours | >98% | >99% | 100% | One quarter |
| ■ Accumulated down time of community isolation | <24 hours | <24 hours | <24 hours | One quarter |
| Network performance | | | | |
| ■ Call success rate (within licensees own network) | >98% | >98% | >99% | One quarter |
| ■ Service access delay | Between 9 to 20 seconds depending upon number of paging attempts (average of 100 calls ≤15 s) | | | One quarter |
| ■ Call drop rate | <4% | <3.5% | <3% | One quarter |
| ■ Connections with good voice quality | >90% | >92% | >95% | One quarter |

*Continued*

For cellular mobile telephone services (*continued*)

| Parameter | *Short term (before the end of 12 months)* | *Intermediate term (before the end of 24 months)* | *Long term (before the end of 36 months)* | *Average over a period of* |
|---|---|---|---|---|
| Billing complaints | | | | |
| i Billing complaints per 100 bills issued | <0.2% | <0.15% | <0.1% | One quarter |
| ii Percentage of billing complaints resolved within four weeks | >99% | >100% | >100% | One quarter |
| iii Period of all refunds/payments due to customers from the date of resolution of complaints as in (ii) above | <6 weeks | <5 weeks | <4 weeks | One quarter |
| Customer perception of service | | | | |
| ■ Satisfied with the provision of service (%) | >80 | >90 | >95 | — |
| ■ Satisfied with the billing performance (%) | >80 | >85 | >90 | — |
| ■ Satisfied with help services (%) | >80 | >85 | >90 | — |
| ■ Satisfied with network performance, reliability, and availability (%) | >85 | >90 | >95 | — |
| ■ Satisfied with maintainability (%) | >85 | >90 | >95 | — |
| ■ Overall customer satisfaction | >80 | >85 | >95 | — |
| ■ Customer satisfaction with offered supplementary services (%) | >80 | >85 | >95 | — |

# Annexe II

## Detailed country experiences on multi-sector regulation

### Spain

The CNE (National Energy Commission) of Spain was set up to regulate the country's energy systems, i.e. (a) the electricity market, and (b) the liquid and gaseous hydrocarbons markets. The Commission is attached to the Ministry of Economy, which monitors the efficiency of its activities and is governed by the provisions of the Hydrocarbons Act and its own by-laws.

The CNE is governed by a Board of Commissioners, which comprises a president, a vice-president, seven members, and a non-voting secretary. It also has separate directors for the areas of energy, gas, petroleum, regulation and competition, administration and inspection, judicial, and external relations. The CNE has a national jurisdiction and also acts as a consultative body on energy matters to the Central State Administration and the governments in the autonomous regions. The important functions assigned to the CNE are (a) implementing legal rules and standards, (b) issuing proposals and reports, (c) playing an executive role, (d) defending competition, (e) settling disputes, and (f) inspecting. In addition, the CNE may carry out any checks it deems necessary in order to confirm the accuracy of the information furnished to it in compliance with its circulars.

### Jamaica

Jamaica is among the few countries having an MSR (multi-sector regulator) that has all the utility service providers under its jurisdiction In Jamaica, the OUR (Office of Utilities Regulation) was established following the promulgation of the OUR Act of April 1995. The OUR Act was amended in 2000 to provide the agency with the power it was not given under the 1995 Act to regulate all utilities. Though OUR is formed by the promulgation of an act, there are a number of other acts, for instance the Telecommunications Act (2000), that affect and are affected by the performance of OUR. It is of importance to note that though there is an act that governs the actions of the Office with regard to telecommunications, but similar acts for water, electricity, and transportation sectors are conspicuous by their absence.

The regulators for water, transport, and electricity have been clubbed together but are segregated from that for telecommunications and are headed by the deputy director general. The director general and the two deputy director generals comprise the Commission. Common sections for analysis and research, legal counsel, administration, communication, and customer affairs have been formed for both the deputy director generals.

Under the OUR Act (1995), the Commission has the power to regulate the following utility services: (a) supply and distribution of electricity, (b) provision of telecommunication services, (c) provision of public transport by road, rail, and ferry, (d) supply and distribution of water, and (e) provision of sewerage services. OUR is mandated to work with the utilities to ensure that customers enjoy high-quality service. It receives and reviews applications for licences and rate reviews presented by the utilities, investigates possible breaches of licences, and takes enforcement action where appropriate. However, it has only recommendatory powers as far as licensing is concerned; the grant of license is still in the hands of the government.

## Canada

### *Federal level*

The NEB (National Energy Board) of Canada, an independent federal regulatory agency established in 1959, regulates the sectors of oil, gas, and electricity at the national level. However, some issues that the NEB deals with were earlier under the jurisdiction of other authorities and were transferred to it on inception.

In the early 1950s, western Canadian oil and gas resources were discovered and developed for interprovincial and international use. Important policy issues arose regarding the conditions for the construction of new pipelines and the approval of long-term exports, particularly of natural gas. In 1959, the Royal Commission on Energy recommended that a national energy board be established. The government acted promptly by establishing the NEB in November 1959. This Act transferred to the new Board the responsibility for pipelines from the Board of Transport Commissioners and the responsibility for oil, gas, and electricity exports from the Minister of Trade and Commerce. In addition, it granted the Board the responsibility of regulating tolls and tariffs. In 1994, legislative amendments expanded the Board's jurisdiction to include a decision-making authority for Frontier Lands not administered through provincial/federal management agreements.

Under the NEB Act, the governor-in-council may appoint up to nine board members. Up to six temporary board members may also be appointed subject to the terms and conditions set out by the governor-in-council. The governor-in-council designates the chairman and vice-chairman of the board from among the members. The Board has employees with diverse skills, including financial analysts, computer specialists, economists, engineers, environmentalists, geologists, geophysicists, lawyers, human resource and library specialists, and administrative staff. Separate offices for the different sectors have not been formed.

Specific aspects of the energy industry regulated by the Board include (a) construction and operation of interprovincial and international pipelines, (b) pipeline traffic, and tolls and tariffs, (c) construction and operation of international and designated interprovincial power lines, (d) export and import of natural gas, (e) export of oil and electricity, (f) frontier oil and gas activities, (g) providing advice on energy to the Ministry of Natural Resources in areas where the Board has expertise derived from its regulatory functions, and (h) carrying out studies and preparing reports when requested by the minister. In addition to its responsibilities under the NEB Act, the Board also has responsibilities under the Canada Oil and Gas Operations Act, the Canadian Environmental Assessment Act, the Northern Pipeline Act, and certain provisions of the Canada Petroleum Resources Act. As a result of the Canada Transportation Act, which came into effect on 1 July 1996, the Board's jurisdiction has been broadened to also include pipelines that transport commodities (i.e., petroleum products) other than oil or natural gas.

### *State level—Ontario*

The OEB (Ontario Energy Board) regulates the sectors of electricity and natural gas. Most of the Board's responsibilities are established in the OEB Act, 1998. In addition, other statutes, which give jurisdiction to the Board, are the Municipal Franchises Act; Oil, Gas, and Salt Resources Act; Public Utilities Act; Assessment Act; Toronto District Heating Corporation Act; and the Electricity Act, 1998.

The OEB has eight full-time members, including the chairman and vice-chairman, plus a number of part-time members. It is a multi-disciplinary group comprising economists, lawyers, accountants, and business people with the knowledge of the energy industry. In addition to the

Board members, the OEB is organized into three main sections: (a) licensing and applications, (b) regulatory affairs, and (c) corporate services.

## Italy

The Italian Regulatory Authority for Electricity and Gas is an independent body set up in December 1996 to regulate and control the electricity and gas sectors. It has been fully operational since 23 April 1997, when it took over all functions within its sphere of activity that had previously been carried out by other public bodies.

The Authority has a board made up of three commissioners: the president and two members. The offices of the Authority are organized into three divisions (electricity, gas, and consumer and service quality) and three services (legislative and legal, documentation and research, and administration and personnel). The external relations office maintains contacts with the press, the media, and with other institutional information services.

The main functions of the Authority are related to tariffs, quality standards, market structure, competition, licensing, accounting and administrative unbundling, monitoring and control, complaints and appeals, disputes, and information and transparency.

## United States of America

### *Federal level*

The FERC (Federal Electricity Regulatory Commission) is an independent regulatory agency within the Department of Energy. It regulates the sectors of electricity, natural gas, oil, and hydroelectric projects at the national level. The FERC was created through the Department of Energy Organization Act on 1 October 1977. At that time, the Commission's predecessor, the FPC (Federal Power Commission), was abolished and the FERC inherited most of its responsibilities.

The Commission is composed of five members and has the following internal departments: (a) office of the general counsel, (b) dispute resolution service, (c) office of administrative law judges, (d) office of the chief information officer, (e) office of external affairs, (f) office of the executive director, (g) office of energy projects, (h) office of market oversights and investigations, (i) office of markets, tariffs and rates, and (j) office of the secretary.

## *State level*

### California

The California Public Utilities Commission regulates privately owned telecommunications, electric, natural gas, railroad, rail transit, and passenger transportation companies. It also regulates certain aspects related to the environment.

The Commission was established as the Railroad Commission in 1911. In 1912, the Legislature passed the Public Utilities Act, expanding the Commission's regulatory authority to include natural gas, electric, telephone, and water companies, as well as railroads and marine transportation companies. In 1946, the Commission was renamed the California Public Utilities Commission. In 1979, the State Legislature further empowered the Commission to regulate the safety of all public transit guideways planned, constructed, and operated in California.

The Commission is organized into several divisions. These are (a) administrative law judges division, (b) communications and public information office, (c) consumer protection and safety, (d) executive office, (e) information and management services, (f) legal division, (g) office of ratepayer advocates, (h) public advisor's office, and (i) strategic planning, energy, telecommunications, and water.

### Washington

The Washington Utilities and Transportation Commission is a three-member board with associated staff who regulate the rates, services, and practices of privately-owned utilities and transportation companies, including electric, telecommunications, natural gas, water, and solid waste collection companies. It also regulates commercial ferries, household goods movers, and low-level radioactive waste disposal. It is important to note that the Commission does not regulate any service that is publicly owned or contracted by a city or town. Also it does not have authority over cellular phone companies, and cable or Internet providers, which are under the jurisdiction of the Federal Communications Commission.

The Commission staff includes accountants, auditors, economists, engineers, consumer complaint specialists, enforcement officers, and investigators, organized into three main divisions: regulatory, advisory, and administrative services.

### Massachusetts

The Massachusetts Department of Telecom and Energy is responsible for the regulation of cable television, electric power, telecom, transportation and gas. Its primary functions include (a) structure and control of monopoly telecommunications and energy, (b) developing alternatives to traditional regulation and traditional monopoly arrangements, (c) controlling prices and profits, (d) monitoring service quality, (e) regulating safety in the transportation and gas pipeline areas, and (f) the siting of energy facilities.

The Department is organized into several divisions, namely (a) rates and revenue division, (b) electric power division, (c) gas division, (d) telecommunications division, (e) siting division, (f) legal division, (g) pipeline safety and engineering division, (h) transportation division, (i) consumer division, (j) administration division, and (k) executive division

### New York

The New York State Public Service Commission was established in 1970 and is responsible for the regulation of electricity, gas, telecommunications, cable, steam, and water. It is responsible for setting rates and ensuring that adequate service is provided by New York's utilities. In addition, it exercises jurisdiction over the siting of major gas and electric transmission facilities and has responsibility for ensuring the safety of natural gas and liquid petroleum pipelines.

The Commission is organized into several offices. These are (a) office of gas and water, (b) office of General Counsel, (c) accounting and finance, (d) administration, (e) communications, (f) regulatory economics, (g) competition transition office, (h) consumer education and advocacy, (i) consumer services, (j) office of electricity and environment, (k) public information office, and (l) office of hearings and alternative dispute resolution.

## Australia

In Australia, the Office of the Regulator-General was not established as an MSR (multi-sector regulator) from its inception. Different sectors were gradually brought under its ambit. The Victorian electricity industry was brought under the regulator's ambit in 1994 by way of the Electricity Industry Act, 1993. The Victorian gas industry was restructured from a state-owned monopoly to a competitive industry, based on providing the lowest possible cost and better service to customers. In March 1997, the government decided to disaggregate Gascor (formerly Gas and Fuel) into at least three businesses, each comprising a distributor owning pipes in a defined geographical area, with a related or 'stapled' retailer. The new businesses commenced operation as divisions of Gascor in July 1997, were fully corporatized in December 1997, and then sold to the private sector in early 1999. It was from December 1997 that the Gas Industry (Further Amendment) Act, 1997, was brought under the jurisdiction of the Office. In both electricity and natural gas, the scope of the Office includes price regulation, standards and conditions of service and supply, licensing, market conduct, and access.

The Melbourne water and sewage industries was brought under the jurisdiction of the regulator from January 1995, by way of the Water Industry Act, 1994. The programme to reform Melbourne's water industry began in 1994 with the objectives of increasing efficiency, maximizing benefit to customers, and reducing the state's debt burden. In January 1995, Melbourne Water was split into the five businesses, which now make up the Melbourne metropolitan water industry. Currently, the regulator has responsibility for the three retail water and sewerage licensees operating in the Melbourne metropolitan area only. Its functions in this sector include licensing, market conduct, and standards and conditions of service and supply.

Price regulation and access of the industry in facilitating export shipping of grain was brought under the regulator's purview from 1 July 1995 as per the Grain Handling and Storage Act, 1995. Most of the grain handling and storage network in Victoria was deemed to be contestable at the time the Grain Handling and Storage Act, 1995, was passed, and was, therefore, not subject to regulatory control. However, this Act does provide for regulatory provisions in three important areas of price regulation, access, and closure of facilities. The grain handling system was privatized in 1999. The regulator's powers were expanded to include certain services in the ports of Melbourne, Geelong, Portland, and Hastings by way of the Ports Services Act, 1995. In this sector, the regulator has powers over price regulation, access, and standards and conditions of service and supply. The regulation of access in the case of rail tracks including trams was also brought under the scope of the regulator in 1999 as per the Rail Corporations Act, 1996.

The Office comprises the Regulator-General who is appointed on the basis of his or her knowledge of, or experience in one or more fields of industry, commerce, economics, law, or public administration. The Minister of Finance may appoint persons as Associate Regulators-General on the basis of their knowledge of, or experience in industry, commerce, economics, and law or public administration. The Office has different directors for (a) electricity regulation, (b) gas, water and ports, (c) price reviews, and (d) corporate services.

### Hungary

The Hungarian Energy Office is an agency of the state administration and enjoys independent responsibilities and jurisdiction on a national level. The responsibilities and jurisdiction of the Office include electricity, gas, and natural heating.

The Office has separate departments for economics and for legal and management issues. It also has separate vice-presidents for price regulation and energy supply. The activities of the regulator, after it was established in 1994 included the unbundling of the former vertically integrated state monopolies of the energy industry, partial privatization of companies and regulation of the structurally re-organized energy sector. The responsibilities of the Office include (a) licensing, regulation, and supervision of the activities of gas and electricity companies enjoying a natural monopolistic position, (b) planning and regulation of the prices of natural gas, electricity, and heat, and (c) consumer protection.

## United Mexican States

The Regulatory Commission for Energy (*Comisión Reguladora de Energía*) of the United Mexican States was created in 1993 and commenced operations in January 1994 as a decentralized technical and consultative body of the Ministry of Energy. The decree that created the Commission limited the scope of its authority to an analysis and consultative role applicable only to the electric industry. Reforms in the Electric Energy Public Service Law (1992) and the Regulatory Law of Article 27 on Petroleum (1995) brought about fundamental changes in the electric and natural gas industries. Prior to these reforms, all activities in the electric and gas industries were restricted to the state, and were operated through governmental (public) entities, Pemex (*Petróleos Mexicanos*) and CFE (*Comisión Federal de Electricidad*), and limited private sector participation was allowed in gas distribution.

The legal reforms explicitly permit the private sector to construct, operate, and own systems of electric generation and allow transportation, storage, and distribution for natural gas. However, the participation of the private sector in these areas required a redefinition of the government regulatory institutions. Accordingly, the Federal Congress enacted the Law of the CRE (*Comisión Reguladora de Energía*) in 1995. The Law enhanced and strengthened the Commission in several important aspects. It established the institutional framework to facilitate the efficient development of the electric and gas industries by implementing legal reforms through a clear, transparent, and stable regulatory structure.

The CRE consists of five commissioners and five specific supporting areas: the executive secretary, two core areas (natural gas and electricity), and three auxiliary areas (legal affairs, the economic policy unit, and electricity restructuring unit).

The fundamental responsibility of the CRE is to promote efficient development of the activities subject to regulation. The participation of the private sector in the electric and natural gas industries requires a clear and transparent legal framework and an autonomous and stable institutional structure to provide the necessary regulatory certainty. The general powers of CRE are as follows.

- Issue permits and authorizations for the development of regulated activities
- Approve model agreements applicable to regulated activities
- Act as a mediator or arbitrator to resolve disputes
- Issue directives (regulatory provisions of general applicability that expand upon and implement regulations)
- *Maintain a public record of regulated activities.*

## United Kingdom

Ofgem (Office of the Gas and Electricity) is the regulator for Britain's gas and electricity industries. Its aim is to bring choice and value to all gas and electricity customers by promoting competition and regulating monopolies. Ofgem is governed by the Gas and Electricity Markets Authority and its powers are provided under the Gas Act, 1986; Electricity Act, 1989; and Utilities Act 2000. The Authority determines strategy and decides on major policy issues. It is made up of non-executive and executive members.

Ofgem has a staff of over 300 people organized into directorates reporting through the management committee to the Gas and Electricity Markets Authority. The directorates are on issues related to customers and supply, competition and trading arrangements, regulation and financial affairs, and operations (human resources, information technology, and finances). It also has a legal division, which reports to the chief executive.

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The regulatory reform exercise is in progress in different sectors of the economy. This reform process aims to reduce cost, delay, and uncertainty leading to consumer benefits in terms of lower prices and wider choices. The process has progressed much in the infrastructure sector, particularly in electricity and telecom, in the past decade.

This book assesses the impact of regulatory reform in the electricity and telecom sectors in this context. This book will be useful for those who shall have to comply with reformed statutes. It will be particularly useful to policy-makers, regulators, executives, academicians, researchers, donors, consultants, and all those involved in the design and implementation of reform programmes.